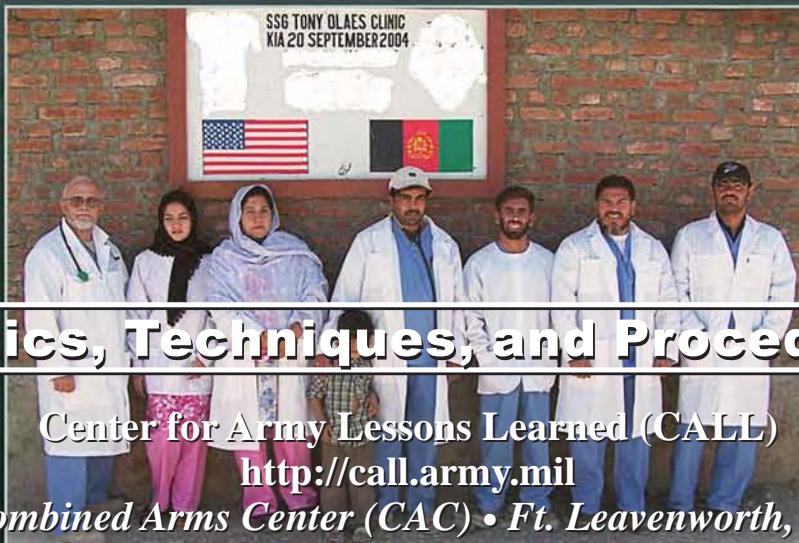


**Training Supplement to
Fall 2008**

Journal of Special Operations Medicine

A Peer Reviewed Journal for SOF Medical Professionals



Tactics, Techniques, and Procedures

Center for Army Lessons Learned (CALL)

<http://call.army.mil>

Combined Arms Center (CAC) • Ft. Leavenworth, KS

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 2008		2. REPORT TYPE		3. DATES COVERED 00-00-2008 to 00-00-2008	
4. TITLE AND SUBTITLE Journal of Special Operations Medicine. Training Supplement to Fall 2008. Tactics, Techniques, and Procedures				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) United States Special Operations Command (USSOCOM),SOC-SG,7701 Tampa Point Blvd,MacDill AFB,FL,33621-5323				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 165	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

Contents

Fall 08

Volume 8, Edition 4

Abstract	1
Correction to Training Supplement Fall 2007	3
Joint Lessons Learned Information System	7
Tactical Combat Casualty Care 2007	9
Section I: Evolving Concepts and Battlefield Experience	9
Section II: The “Kandahar Tourniquet”	49
The Role of Medical Diplomacy and Stabilizing Afghanistan	53
Special Operations Medical Association 2007	65
Female Treatment Teams After Action Report: Combined Joint Special Operations Task Force-Afghanistan (CJSOTF-A), Task Force (TF)–71	111
Marine Corps Lessons Learned Operation Iraqi Freedom 06-08	131
Guidelines for the Prevention of Infection after Combat-Related Injuries	143
Acronyms	161
References	165

Abstract

When United States Army Special Operations Command (USASOC) command surgeon COL Warner “Rocky” Farr considers the lessons learned by his command from recent wars, he quickly notes that many of the same lessons were learned in the course of every modern war. “In *Black Hawk Down*, there was a Ranger who had a very high wound in the thigh that no one could get a tourniquet around,” Farr said, “and we have looked for the magic piece of equipment that could save that Ranger. Some of the new equipment we have was designed with that Ranger in mind to prevent another case like his.”

“When you look at the care that has been provided out there in the war, we don’t need magic bullets,” he added. “We fielded the right equipment that is doing the job and skilled medics that are trained to do the job. We are not seeing casualties that die from lack of care or lack of medical equipment; we are seeing casualties who live from expert special operations forces medics providing care under fire.”

The above statements were published in December 2005 in the special operations technology magazine titled *SOF Medicine*.

This document is a compilation of open source material collected and analyzed by the Center for Army Lessons Learned (CALL) from special operations medical personnel deployed in support of the Global War on Terrorism. The majority of the observations, insights, and lessons (OIL); tactics, techniques, and procedures; and best practices are derived from Operation Iraqi Freedom and Operation Enduring Freedom actions in theater and lessons learned. However, because special operations forces (SOF) are globally engaged executing missions across the full spectrum of operations, OIL from numerous areas of responsibility have been included.

Special operations capabilities are employed as far forward and as close to the point of wounding as possible. SOF administer tactical combat casualty care while under fire to save lives and maintain the operator in the fight. Special operations medical personnel must provide austere trauma care to sustain the wounded. Casualty evacuation coordination is a must to insure casualties can reach forward Level II/III surgical care facilities but may be limited in response time due to area of operations.

The term special operations medic used throughout this document is meant to be inclusive of USASOC medical personnel; United States Air Force Special Operations Command pararescuemen and independent duty medical technician personnel; United States Naval Special Warfare Command Sea, Air, Land and independent duty corpsmen; and United States Marine Special Operations Command corpsmen.

This supplement is being formatted into a handbook to be published by CALL.

Chapter 1

Correction to Fall 2007 Training Supplement

Casualty Evacuation Operations

Journal of Special Operations Training Supplement to Fall 07 Vol 7 Ed 4

CAPT Douglas H. Freer brought the following corrections to our attention. We certainly hope that the previous erroneous information did not distract from mission requirements of all special operations medical personnel. Page 37 of the Fall 2007 Supplement concerning watercraft medical capabilities is corrected to reflect the following:

Fleet Medical Capabilities

The majority of United States Navy vessels have some organic medical capability to provide for the health and safety of the ship's crew. Vessels with surgical capabilities are the hospital ships, aircraft carriers, and amphibious ships designated as casualty receiving platforms. Aircraft carriers are not considered casualty receiving ships, and the organic surgical capabilities aboard these ships is designed to support the needs of the high tempo general health care needs of the ship's company. The carrier's medical capability also provides consultation and support of other vessels comprising a carrier battle group. The large deck amphibious assault ships are also aviation platforms and possess robust medical capabilities to support amphibious operations as well as the general needs of the ship's company and embarked Marines. Hospital ships serve a variety of missions to include combat service support, humanitarian assistance, and a force deterrent option.

The general medical characteristics for the major classes of amphibious ships that can be designated as casualty receiving platforms are as follows:

1. Large deck aviation platforms

a. LHA (amphibious assault ship—multipurpose) Tarawa Class

Operating rooms	4
ICU beds	15
Ward beds	45
Dental operatories	3
Ancillary	Lab, blood bank, X-ray, pharmacy

b. LHD class (amphibious assault ship—general purpose) Wasp Class

Operating rooms	6 (4 major, 2 minor)
ICU beds	15
Ward beds	18

Dental operatories	3
Ancillary	Lab, blood bank, X-ray, pharmacy

Note: Overflow berthing is available only if the Marine landing force is disembarked. Concept of operations is that of a Level II surgical platform performing resuscitative surgery and medical evacuation to higher levels of care.

2. Amphibious transport dock ships (LPD)

a. LPD-17 (San Antonio Class)

Operating rooms	4 (2 major, 2 minor)
ICU beds	6
Ward beds	18
Dental operatories	2
Ancillary	Lab, X-ray, pharmacy, (no blood bank)

b. LPD-4 (Austin Class)

Operating rooms	0
ICU beds	0
Ward beds	13 plus 4 isolation ward beds
Dental operatories	1
Ancillary	Lab, X-ray

3. Amphibious transport dock (LSD)

a. Whidbey Island, Harpers Ferry, and Anchorage classes

Operating rooms	0
ICU beds	0
Ward beds	6-8, plus 1-2 isolation beds depending on class
Dental operatories	1
Ancillary	Lab, x-ray

4. Amphibious command ships (LCC) are not casualty receiving ships. The Blue Ridge (LCC-19) serves as the flagship for commander, Seventh Fleet. The Mount Whitney (LCC-20) is the flagship for commander, Second Fleet.

Operating rooms	0
ICU beds	0
Ward beds	20 plus 4 isolation beds
Ancillary	Lab, x-ray

5. LPH, AKA, APA, LST class ships are no longer in active service.

6. Hospital ships (T-AH) may provide support to major amphibious operations or be designated as a theater-level 3 support capability. Assets in Readiness 1 state:

Operating rooms	12
ICU beds	100
Intermediate care beds	400
Minimal care beds	500
Ancillary bank, pharmacy	Lab, X-ray, computed axial tomography, blood

Chapter 2

Joint Lessons Learned Information System

The Chairman of the Joint Chiefs of Staff Joint Lessons Learned Program (JLLP) (CJCSI 3150.25C, April 2007) established the Joint Lessons Learned Information System (JLLIS) as the Department of Defense (DOD) system of record for the JLLP (CJCSN 3150.25, Jan 2008). JLLIS will provide one interoperable lessons learned system for the DOD with linkages to other DOD systems such as the Defense Readiness Reporting System, Joint Training Information Management Systems, Joint Doctrine Electronic Information System, and other future linked DOD systems as required in the DOD Training Transformation Implementation Plan.

The JLLIS for special operation forces (JLLIS-SOF) is the primary tool used by the United States Special Operations Command (USSOCOM) Lessons Learned (LL) Branch to support the commander of USSOCOM in the execution of his Title 10 responsibilities and as the supported combatant commander for the Global War on Terrorism (GWOT). USSOCOM is actively engaged in the JLLP, where the goal is to improve interoperability between all LL centers in the community of practice to enhance joint war fighting and support the strategic plan for the DOD training transformation.

The JLLIS-SOF is designed to manage the lesson collection, tracking, data mining, and dissemination requirements for USSOCOM and the respective components. The JLLIS-SOF is a tool that supports the collection of lessons from the junior to senior levels of USSOCOM. The JLLIS-SOF provides for collections across all areas of interest and is not theater or operation specific. The JLLIS-SOF maintains a number of topical information management systems and databases that support the center's mission but are also available to servicemembers and the research community.

The USSOCOM medical community recognizes the importance of the LL program. Command awareness and support are critical for effective LL programs. The special operations community is learning that highly developed after-action reviews (AARs) lead to enhanced mission execution and better resourcing solutions. The entire special operations community must increase the collection of LL information in order to input this information into the USSOCOM JLLIS. This is the first step to capturing best practices and to truly benefit from a more complete LL information capture and management process.

JLLIS-SOF is the system of record for all medical AARs as directed by the USSOCOM command surgeon and the Joint Medical Enlisted Advisory Council (JMEAC). The JMEAC has stressed the increasing importance of capturing LL information because we all possess the intellectual capital of our respective commands, so it is imperative that we support such an important program that affects so many key command processes. In the case of medical LL, it directly saves lives.

Access to JLLIS-SOF is via the Secure Internet Protocol Router network. Access to this site is controlled with a registration process. This registration process helps ensure appropriate personnel are accessing the sites. Users establish a profile based on their registration information. Users can update this profile after initial and subsequent logins and whenever there is a change to a name, rank, email address, search preferences, personal information, or other contact information.

My Profile allows users to access their personal profile, update as required, and define up to ten topics of interest in order to receive an email notification when new information is available

regarding these topics. The email notification will not include any information other than a notice that information is available and a brief description of the information.

As the GWOT continues, it is critical to implement an effective LL program so that all can profit from LL information. The ability to effectively collect, analysis, archive, resolve, and disseminate LL information, using tools such as JLLIS-SOF, throughout special operations, conventional, and joint communities will allow for improved outcomes and the resolution of systemic issues. This process will help all to accelerate transformation and improve collaboration among conventional, joint, and interagency partners and contribute to mission success for all.

SOKF-J7-AL serves as the LL Branch focal point for SOF LL. Point of contact Marc Hallal, UC2. (813-826-4787, DSN 299-4787)

Chapter 3

Tactical Combat Casualty Care 2007

Section I. Evolving Concepts and Battlefield Experience

CAPT Frank K. Butler, Jr., et al

The tactical combat casualty care (TCCC) project begun by the Naval Special Warfare Command and continued by the U.S. Special Operations Command (USSOCOM) developed a set of tactically appropriate battlefield trauma care guidelines that were initially published in 1996. Transition of these guidelines into use throughout the Department of Defense has been ongoing since that time. The need for updates to the TCCC guidelines was recognized early on and has been carried out by the committee on TCCC (CoTCCC), established and operated by the Naval Operational Medicine Institute. This section describes the evolution of these guidelines from the 1996 recommendations to the present. Numerous reports in the medical literature and collected from combat first responders have documented that TCCC is saving lives on the battlefield and improving the tactical flow of missions where casualties occur. Present challenges optimizing implementation of TCCC in U.S. combat units include the need to expedite transition of new TCCC techniques and technologies to deploying units, provide TCCC training for all U.S. combatants, and ensure adequate funding for the CoTCCC.

Introduction

Prehospital trauma care as performed on the battlefield differs markedly from that performed in the civilian sector. Treatment guidelines developed for the civilian setting do not necessarily translate well to the battlefield and may result in preventable deaths and unnecessary additional casualties if the tactical environment is not considered when rendering care. The austere nature of the tactical environment must be considered in developing the treatment plan. Simplicity is key. Equipment required to execute the plan must also be simple, light, and rugged.

The need for reconsideration of trauma care guidelines in the tactical setting has long been recognized (Bellamy, 1987; Baker, 1994; Heiskell and Carmona, 1994). The TCCC project begun by the Naval Special Warfare Command in 1993 and later continued by USSOCOM developed a set of tactically appropriate battlefield trauma care guidelines that were published as a special supplement to military medicine in 1996 (Butler et al., 1996).

The recommendations in this article were somewhat at odds with civilian prehospital management strategies being taught at that time, but the advantages of having battlefield trauma guidelines optimized for the tactical setting was quickly recognized. The TCCC guidelines were first taught in 1996 in the Undersea Medical Officer course sponsored by the Navy Bureau of Medicine and Surgery (BUMED). Shortly thereafter, this training was mandated for all Navy Sea, Air, Land (SEAL) corpsmen (Richards, 1997). Since that time, TCCC gradually gained acceptance in U.S. (Allen and McAfee, 1999; Malish, 1999; Butler, 2001; DeLorenzo, 2001; Pappas, 2001) and foreign (Krausz, 1998) military forces, as well as in the civilian law enforcement medical community (McDevitt, 2001). These early transitions of TCCC were largely unit-based initiatives resulting from the individual efforts of unit medical officers and noncommissioned officers, but now TCCC is standard instruction in all three services' medic schoolhouses.

An important milestone in the transition process was the inclusion of the TCCC guidelines in the *Prehospital Trauma Life Support (PHTLS) Manual*. The fourth edition of this manual, published

in 1999, for the first time contained a chapter on military medicine (McSwain et al., 1999). Preparation of this chapter was coordinated by CAPT Greg Adkisson and COL Steve Yevich at the Defense Medical Readiness Training Institute in San Antonio, TX. The recommendations contained in the PHTLS manual carry the endorsement of the American College of Surgeons Committee on Trauma and the National Association of Emergency Medical Technicians. TCCC is the only set of battlefield trauma care guidelines ever to have received this dual endorsement.

The Committee on Tactical Combat Casualty Care

The need for periodic updates to the TCCC guidelines was recognized early in the development of TCCC (Butler et al., 1996). There have been a number of changes made to the original guidelines in the ensuing 11 years. Some of the proposed changes originated from military medical audiences during TCCC training; others were identified during focused workshops to study real-world and hypothetical combat trauma scenarios (Butler and Smith, 1996; Bowden, 1999; Butler and Hagmann, 2000); still others came from reviews of the interim scientific and medical literature.

The 1996 TCCC article recommended that the TCCC guidelines be updated periodically by a Department of Defense-funded committee established for this purpose. In 2001, this project was presented to the USSOCOM Biomedical Initiatives Steering Committee chaired by the USSOCOM Command Surgeon, COL Dave Hammer. It was favorably endorsed and subsequently funded as a 2001 to 2002 USSOCOM biomedical research project. A key concern of the Biomedical Initiatives Steering Committee was to structure the project in such a way that it could be transitioned to one of the services later, providing for follow-on long-term support and continuation of the process beyond the research and development phase. This concern was shared by the command chosen to execute the project, the Naval Operational Medicine Institute (NOMI). As part of the planning for this effort, CAPT Doug Freer, NOMI's commanding officer at the time, coordinated with Navy medicine leaders to arrange for long-term sponsorship. BUMED programmed for financial and personnel support of the CoTCCC beginning in fiscal year 2004. The transition from initial support by USSOCOM to permanent BUMED sponsorship was accomplished smoothly.

Since the basic principle of TCCC is to provide the best possible trauma management plan consistent with good tactics, the membership of the CoTCCC includes combat medics as well as physicians. Tri-service representation was critical to ensure that differences in doctrine and experience among the Army, Navy, and Air Force medical departments were captured. (Marine Corps combat operations are supported medically by Navy health services personnel.) The combat medics selected included SEAL corpsmen, Navy corpsmen assigned to Marine units, Ranger medics, Special Forces 18-D medics, Air Force pararescuemen, and Air Force aviation medics. Physician membership included representatives from the trauma surgery, research, emergency medicine, critical care, and operational medicine communities. Physician assistants and combat medical educators were also represented. A list of the membership of the original CoTCCC Combat Casualty Care (a total of 28) is included in Table I. The committee membership in 2004 to 2005 is shown in Table II. Upon its transition to a permanent body, the committee's membership was expanded to include greater representation for the Marine Corps and representation for the Public Health Service, including the Coast Guard.

TCCC Updates 2003 and 2006

The CoTCCC has continued to monitor advances in medicine and technology as well as shifts in combat techniques and procedures. It uses such information to continually update the TCCC guidelines on a cycle matched to the publication of the PHTLS manual. The original TCCC

guidelines published in 1996 are presented in Table III. The 2003 revision of the guidelines was published in the second printing of the fifth edition of the PHTLS Manual (McSwain et al., 2003) as outlined in Table IV. The current guidelines were approved by the CoTCCC in 2006 and published in the sixth edition of the PHTLS Manual as shown in Table V (McSwain and Salome, 2006). The sixth edition includes both civilian and military versions. Although both versions contain the core PHTLS material and the latest updates to the TCCC guidelines organized into the three phases of care on the battlefield (Care Under Fire, Tactical Field Care, and Casualty Evacuation [CASEVAC] Care) described below, the military version also contains additional chapters on the management of wounded hostile combatants, guidelines for determining the urgency of casualty evacuation, hypothermia, triage, blast injuries, and military medical ethics.

Metrics

When new medical treatment plans are proposed, an evidence-based approach to documenting the efficacy of these treatments is desirable. This evidence is uniquely hard to gather from the battlefield, however, since studies are difficult to perform in this setting, especially randomized, prospective, controlled ones. Input regarding the outcomes from TCCC practiced on the battlefield can, however, be obtained from published case reports and case series as well as lessons learned reported by first responders describing their experiences with combat trauma care. The sections below will describe how various aspects of the TCCC guidelines have evolved from 1996 to the present and present available evidence for the various aspects of care.

Phases of Care in TCCC

There has been general acceptance that trauma care on the battlefield must be appropriate to the tactical environment, especially with respect to potential contact with enemy forces and the presence of effective incoming hostile fire. In simplest terms, a medic caring for a casualty in the middle of an engagement with hostile forces needs to be much more selective about what interventions to perform than he would in a hospital emergency department. The primary focus should be on interventions that address preventable causes of death on the battlefield until the tactical situation allows more comprehensive care. The integration of trauma care into the tactical flow that the unit must maintain in a casualty situation is invaluable to line commanders who must structure their unit's response to casualty scenarios in a way that achieves the three guiding objectives of TCCC: (1) treat the casualty, (2) prevent additional casualties, and (3) complete the mission (Butler, 2001). Although dialogue is ongoing about the specifics of what care to provide in the three phases of care (Care Under Fire, Tactical Field Care, and CASEVAC Care), authors discussing TCCC have not proposed changes to this phased approach to care (Butler and Hagmann, 2000; Butler, 2001; 2003; Tarpey, 2005; Butler et al., 2006; King et al., 2006; Mucciarone et al., 2006).

Tourniquets

Civilian trauma courses used to train military combat medics in the early 1990s (Alexander and Proctor, 1993) strongly discouraged the use of tourniquets, and the view that tourniquets should only be used as a last resort to stop life-threatening bleeding is still held by some authors and trauma courses (Welling et al., 2007). This aversion to the use of tourniquets to treat severe extremity hemorrhage denies the casualty treatment that is often lifesaving in the tactical environment.

A review of this topic for the original TCCC article found data from the Vietnam conflict that showed that the most common cause of preventable death on the battlefield was exsanguination

from extremity wounds. Uncontrolled bleeding from extremity hemorrhage was the cause of death for >2,500 fatalities in Vietnam and is still the leading cause of preventable deaths on the battlefield today (Maughon, 1970; King et al., 2006; Starnes et al., 2006). The 1996 guidelines, therefore, advocated the aggressive use of tourniquets to control bleeding in the Care Under Fire phase of care (Butler et al., 1996). This was a restatement of calls for the judicious use of tourniquets from military authors in conflicts past (Wolff and Adins, 1945).

In addition to the 2,500 Vietnam deaths that could have been prevented with tourniquets, case series and reports describing lives saved or lost on the battlefield because of tourniquet issues date back at least as far as the Civil War, where Confederate General Albert Sydney Johnston was killed in the battle of Shiloh from a gunshot wound to the popliteal artery. He bled to death without thinking to use the tourniquet in his pocket (Welling et al., 2006).

Recent studies have addressed the issue of which tourniquet to use. Testing in 2000 and 2001 was conducted on a tourniquet known as the “one-handed tourniquet” (Walters and Mabry, 2005). The name emphasizes the concern that a Soldier with a traumatic amputation of one upper extremity would need to apply the device with his remaining hand. This tourniquet was found to be clearly more effective than the old strap and buckle device previously issued to combatants. A number of units (~20,000) were subsequently procured by the Army and fielded, and a combat evaluation was undertaken. Although there was some positive feedback regarding the one-handed tourniquet, combat medics reported that it did not work well on lower extremity wounds. The U.S. Army Institute of Surgical Research (USAISR) subsequently performed a reevaluation of commercially available tourniquets.

The USAISR tourniquet study noted that an ideal tourniquet for battlefield use should be light, durable, easily applied under combat conditions, and capable of reliable occlusion of arterial blood flow. Cost is also a factor. This study examined seven tourniquets available from commercial sources at the time and found that three were successful in completely occluding blood flow in both upper and lower extremities: the emergency military tourniquet (Delfi), the combat application tourniquet (CAT) (Phildurango LLC), and the special operations force tactical tourniquet (Tactical Solutions LLC) (Walters et al., 2005b). The report from this study recommended that the combat application tourniquet be carried by all combatants and that medics also carry the emergency medical tourniquet (Walters et al., 2005b).

A laboratory evaluation of tourniquets for Canadian military forces examined five tourniquets (excluding the CAT tourniquet) and recommended the emergency military tourniquet and latex surgical tubing as effective tourniquet choices (King et al., 2006). These authors also noted that “. . . tourniquet use in the tactical environment will continue to be an operational and medical requirement. All Soldiers should be issued a tourniquet and trained in its use” (King et al., 2006).

The Navy Experimental Diving Unit published an evaluation on six tourniquets (excluding the emergency medical tourniquet) in 2005 and noted that “all tourniquets except the OHT1 (one-handed tourniquet 1-inch width) and the Quick (Quickette) performed reasonably well on arms and legs, with median occlusion efficacies exceeding 70%.” They also noted that the occlusion efficacies of the CAT, the mechanical advantage tourniquet (MAT), one-handed tourniquet 2-inch width (OHT2), and Tourni-Kwik (TK) were statistically indistinguishable. These tourniquets also had low mechanical failure rates and clinically acceptable application times (Ruterbusch et al., 2005).

All of the tourniquet studies emphasized that appropriate training in tourniquet use on the battlefield is essential to its successful use. An excellent review of issues related to tourniquet use is provided by Walters and Mabry (2005).

After the USAISR study, the CAT was selected as the tourniquet of choice for deploying individuals and units by USSOCOM. This tourniquet was subsequently provided to deploying special operations forces (SOF) (USSOCOM message 222016Z, March 2005). The CAT was also selected as the tourniquet of choice by the Army (Kiley, 2005a,b) and required by the U.S. Central Command (CENTCOM) for all combatants entering the CENTCOM area of operations (CENTCOM message 061715Z, January 2005).

With respect to tourniquets, evaluating the success of this recommendation depends on answering two key questions: (1) Can we document that these devices are saving lives on the battlefield? (2) What complications may be ensuing from their use? Dr. Carl Hughes, a prominent trauma surgeon in the Korean War, stated: “I had a number of vascular injuries sent to me with tourniquets applied. I believe that they were mainly the pneumatic tourniquets. I do not ever recall seeing limb loss as a result of a tourniquet. They were important, even life-saving in Korea” (Welling et al., 2006). Cloonan (2004) states that: “The current recommendations regarding the use of tourniquets in forward areas, which include liberal tourniquet use in active combat and later reassessment and replacement as time and circumstances permit, are surprisingly similar to those made after the Korean War.”

A report describing the Israeli experience with tourniquets applied on the battlefield reported 91 uses on combat casualties (Lakstein, 2003). Seventy-eight percent of these tourniquets were successful in controlling bleeding. A higher percentage of success was reported for upper extremities (94%) than for lower extremities (71%). The authors also reported infrequent complications from tourniquet use, with seven instances of peripheral neuropathies attributed to tourniquet use in five casualties, for a rate of 5.5 percent. Both ischemia and mechanical pressure were postulated as etiologies for the neuropathies. No cases of ischemic limb necrosis were reported. The authors noted that an improvised “strap and windlass” type tourniquet was felt to be superior to the silicone variety that was issued. The authors described tourniquet use on the battlefield as fast, easy, and potentially lifesaving.

The TCCC Transition Initiative sponsored by USSOCOM and executed by the USAISR included training SOF in TCCC principles, fielding newly approved TCCC equipment to deploying SOF, and providing a combat evaluation of this equipment through the collection of feedback from first responders and other medical providers (Butler and Holcomb, 2005; Butler et al., 2006). Data on the use of TCCC equipment and techniques have been compiled and include numerous reports of lifesaving tourniquet use by special operations combat medics and other first responders. MSG Ted Westmoreland reported the successful use of CATs to stop arterial bleeding of the left proximal thigh and another report indicated this device was successful in controlling hemorrhage from a left lower leg wound (Butler et al., 2006). MSG Harold Montgomery reported seven Ranger lives saved with tourniquets in one operation (Butler et al., 2006). One report from 31st Combat Support Hospital personnel describing their experiences over a one-year period identified 44 casualties arriving at their facility for whom tourniquet use was judged to be lifesaving (Butler et al., 2006).

Tourniquets were successfully used in 67 cases. Since this collection did not necessarily include data from the casualty’s entire hospitalization period, the incidence of peripheral neuropathies and other potential complications is not available from this report. Several combat medics initially reported problems controlling femoral bleeding with the CAT. Specifically, medics reported the windlass would break when tightened with the force necessary to be effective on the upper thigh (Butler et al., 2006; Appendix 5). The windlass on this device was subsequently strengthened by the manufacturer.

The Navy Operational Medical Lessons Learned Center database has several reports dealing with tourniquet use on the battlefield. One account describes two Marines successfully applying tourniquets to themselves while under fire in a high mobility multipurpose wheeled vehicle (NOMLLC Lesson 40329), while another describes an Army reservist embedded with a foreign unit who used a tourniquet to save the life of a casualty (NOMLLC Lesson 39582). The type of tourniquet in these two reports was not mentioned.

Tarpey (2005) addressed the use of tourniquets in his experience with the 3rd Infantry Division in Operation Iraqi Freedom (OIF): “Tourniquets played a decisive role in quickly and effectively stopping hemorrhage under fire and keeping a number of Soldiers with serious extremity wounds involving arterial bleeding alive until they could eventually undergo emergent surgery at the forward surgical team.” The author also stated that: “Given the intense conditions under which our medics treated casualties, it would have been absolutely impossible for them to have attempted to hold pressure over wounds while continuing to fight and treat other wounded.” There were no known complications ensuing from tourniquet use in this report.

A recent retrospective analysis of the Navy SEAL casualties sustained in the assault on Punta Patilla Airfield in Panama in 1989 found that control of extremity hemorrhage had the greatest positive impact on casualty care, noting that the three tourniquets applied in that action saved lives. No complications from tourniquet use were mentioned (Mucciarone et al., 2006).

Mabry (2001) described the injuries sustained in the Battle of Mogadishu in 1993 and reported that tourniquets were used liberally in the combat support hospital and at least once on the battlefield in a casualty with a severe extremity wound. There were no reports of complications from tourniquet use in the casualties from this battle.

Starnes et al. (2006) note that “there is overwhelming evidence that the majority of survivable war injuries since the beginning of time have been predominantly extremity injuries.” The authors call for the use of tourniquets in managing exsanguinating extremity hemorrhage, but note that an improperly applied tourniquet can actually increase blood loss if it is tight enough to impede venous return but loose enough to allow arterial flow.

Another approach to addressing metrics for tourniquet use is the study performed jointly by USSOCOM, USAISR, and the Armed Forces Institute of Pathology (Holcomb et al., 2007). This project was a postmortem analysis of the first 82 fatalities suffered by SOF in the Global War on Terrorism (GWOT). Seventy of the 82 deaths examined were judged to be nonpreventable, while 12 of the fatalities were judged to have wounds that were potentially survivable. Three of these deaths were attributable to failure to apply an effective tourniquet to extremity wounds. Other reports of fatalities that might have been prevented by prompt application of an effective tourniquet have been noted during OIF/Operation Enduring Freedom (West et al., 2004; Butler et al., 2006).

Tourniquet use in the tactical prehospital environment was reviewed by Holcomb in the 2004 Fitts lecture to the American Association for Surgical Trauma and summarized in the following statement: “Hemorrhage control with liberal tourniquet use and advanced hemostatic dressings is paramount” (Holcomb, 2005a).

Battlefield experience has shown that tourniquets are not intuitive devices, and combatants must be well trained in their use. Mistakes in tourniquet use reported from combat units include using tourniquets on wounds in which severe bleeding was not present, not using them on other wounds where they were indicated, loosening the tourniquet to allow intermittent return of blood flow to the injured extremity, not applying the tourniquet tightly enough, and removing the

tourniquet prematurely (Butler et al., 2006). Clearly presented guidelines on tourniquet application and removal reflecting the current U.S. Army guidelines on this issue are available in the TCCC section of the PHTLS manual (McSwain and Salome, 2006). Additional thoughts on tourniquet guidelines are available from other authors as well (Navein et al., 2003).

Hemostatic Agents

No hemostatic agents had been approved by the Food and Drug Administration (FDA) and proven to be effective in stopping life-threatening hemorrhage at the time of the publication of the original TCCC guidelines; therefore, these agents were not addressed at that time. By the 2003 revision, however, a number of hemostatic agents to aid in the control of battlefield bleeding had been developed. The agents best supported by data from ongoing studies at the time (Alam et al., 2003, 2004; Sondeen et al., 2003b; Pusateri et al., 2003, 2004) as being able to stop massive hemorrhage were reviewed by the committee. Both the chitosan-based bandage HemCon (HemCon Medical Technologies, Portland, OR) and the zeolite powder QuikClot (Z-Medica, Wallingford, CT) were judged to be effective based on study findings to date. Although the committee was not able to identify a clear winner based on efficacy, there were concerns about burns from the exothermic reaction produced by QuikClot (Burris, 2003; Pusateri et al., 2004; Wright et al., 2004a,b). HemCon was selected as the initial TCCC hemostatic agent of choice (McSwain et al., 2003) (Table IV).

CoTCCC reevaluated the hemostatic agent recommendation for the 2006 TCCC guidelines and conducted a focused meeting on this topic. Combat-experienced first responders and trauma surgeons were asked to describe their experiences with both QuikClot and HemCon. The Army and SOF had been issuing and using HemCon, while the Marine Corps and Air Force had elected to use QuikClot. The findings from Wedmore and his colleagues (noted below) were presented, as were case reports from the TCCC Transition Initiative (Butler et al., 2006). Published accounts of QuikClot use on the battlefield were not available at the time of this review, although it had been reported successful in one trauma surgery patient in whom other attempts at operative hemostasis had failed (Wright et al., 2004a,b).

Several Navy corpsmen assigned to the Marine Corps described successful uses of QuikClot on the battlefield. Although there were reports of pain on application from use of QuikClot, there were also anecdotal reports of lives saved by use of this agent. Trauma surgeons caring for USMC casualties reported that tissue damage from QuikClot's exothermic reaction, while observed in the operating room, had not presented major problems nor resulted in significant additional tissue loss in casualties. Both agents have been shown to be effective in animal models of severe bleeding (Alam et al., 2003, 2004, 2005; Pusateri et al., 2003; Sondeen et al., 2003b; Ahuja et al, 2006).

Once again, the committee did not declare a clear winner in terms of efficacy. The revised position published in the 2006 guidelines (Table V) was that both agents should be carried by all combatants on the battlefield. HemCon was recommended for use in the Care Under Fire Phase for cases of severe external bleeding not amenable to tourniquet placement. Both agents were recommended for use in the Tactical Field Care and CASEVAC phases of care, with QuikClot used as a secondary agent if HemCon was not effective or available (McSwain and Salome, 2006). This position was reiterated by a recently published review article on hemostatics (Pusateri et al., 2006).

HemCon has since been reported to be effective on the battlefield in a retrospective study of its use by SOF (Wedmore et al., 2006a,b). The authors reported 64 uses of HemCon in combat casualties. In 97 percent of the casualties, HemCon use resulted in cessation of bleeding or

improvement in hemostasis. The majority (66%) of these uses followed treatment failures with standard gauze dressings. Use of HemCon was most important in the treatment of superficial torso, head and neck, and very proximal limb injuries in which a tourniquet could not be applied.

Tarpey (2005) reported a case of QuikClot use in OIF on a thigh wound with femoral bleeding in which the medic was unable to stop the bleeding with a tourniquet. QuikClot was poured carefully onto the wound and successfully stopped the bleeding without causing skin burns. A case series of QuikClot use has recently been prepared (Rhee et al., in press). There were 83 external uses of this agent by first responders in the field, and all were reported to be successful at controlling the hemorrhage. The exothermic reaction produced by QuikClot produced pain that ranged from mild to severe in this series. There were three reported cases of skin burns, with one burn requiring skin grafting (Rhee et al., in press). In contrast, a Marine Corps battalion surgeon submitted a case series to the Navy Operational Medical Lessons Learned Center in which QuikClot was unsuccessful in four battlefield uses, with two of the four casualties exsanguinating (NOMLLC Lesson Learned 8177). It is not clear from this report that direct pressure was used in conjunction with the QuikClot application as the directions call for; therefore, these failures may have been in part a training issue. Another recent report has described a series of four casualties with cutaneous burns from QuikClot use (McManus et al., 2007). The reports of pain and cutaneous burns from QuikClot use strengthen the case for using QuikClot only when HemCon has failed or is not available.

The fibrin dressing has also shown promise (Sondeen et al., 2003a,b; Kheirabadi et al., 2005, 2007; Acheson et al., 2005) but is expensive (~\$1,000 per dressing) and is not FDA approved at present (Pusateri et al., 2006).

Nasopharyngeal Airway

The preeminence of opening the airway has been well reinforced by cardiac and trauma courses that emphasize the “ABCs”—airway, breathing, and circulation. Definitive airway control for an unconscious patient in the civilian sector is generally considered to be endotracheal intubation.

However, an analysis of combat fatalities in Vietnam showed that only a very small percentage of deaths in combat casualties were due to airway compromise (McPherson et al., 2006). Furthermore, measures that are well known to be successful in the civilian sector such as manually positioning the head to open the airway or performing endotracheal intubation may not have the same efficacy on the battlefield, where most of the airway deaths are due to maxillofacial trauma. Blood in the airway and anatomy distorted by trauma may make intubation exceedingly difficult to perform in the combat prehospital environment. Additionally, intubation is not a skill frequently practiced by most combat medics, and the white laryngoscope light used during the procedure is not recommended for nighttime combat operations.

Most unconsciousness on the battlefield in classic ground combat results from hemorrhagic shock or penetrating trauma to the head. For these casualties, the 1996 TCCC guidelines called for the use of a nasopharyngeal airway as the airway device of choice when the casualty did not have injuries that would preclude the effective use of this device. This recommendation has also been included in the 2003 and 2006 guidelines.

Several battlefield reports have addressed this issue. One is an account of an Israeli physician who attempted to intubate an unconscious casualty on a battlefield at night. The physician was shot in the head and killed during the intubation attempt while the laryngoscope light was displayed (unpublished data).

Another is a report of the intracranial insertion of a nasopharyngeal airway in a patient with a closed head injury (Martin et al., 2004). Use of this airway in casualties with closed head injuries may need to be reevaluated, although adequate training in the insertion of this device with an emphasis on the direction of insertion being 90 degrees to the perpendicular plane of the face rather than in a cephalad course along the long axis of the nose, should prevent this complication.

One concern about the use of a nasopharyngeal airway is the potential for an unconscious casualty to vomit and aspirate. There were no reports identified in Iraq or Afghanistan in which this occurred despite the potential risk. This potential risk must also be considered in light of the potential risk of a preventable death should an esophageal intubation not be recognized in the confusion of a combat casualty scenario.

Surgical Airways

The 1996 TCCC guidelines called for the aggressive use of surgical airways in the Tactical Field Care phase when maxillofacial trauma makes the use of a nasopharyngeal airway inadequate to open the airway. This recommendation has been carried forward into the 2003 and 2006 guidelines.

One Army special operations unit described a series of prehospital surgical airway procedures. There were seven procedures done over the course of several years. Four of the procedures were done for maxillofacial trauma, two for unconsciousness (and presumably failure of less invasive measures to restore the airway), and one for seizures. Six of the seven procedures were accomplished successfully with five of the seven casualties surviving. The remaining casualty was successfully intubated after the unsuccessful attempt at a surgical airway. Neither of the two casualties who died did so as a result of airway compromise (Butler et al., 2006).

The study by Holcomb et al. (2005a) on special operations fatalities in the GWOT noted that 1 of 12 potentially preventable deaths was due to airway failure after maxillofacial trauma from a gunshot wound. The attempted intubation was unsuccessful, and no surgical airway was attempted.

Tension Pneumothorax

Tension pneumothorax can be fatal if not treated promptly and in previous conflicts has been a leading cause of preventable death in combat casualties (Maughon; 1970; McPherson et al., 2006). On the battlefield, the usual clinical indicators of decreased breath sounds, tracheal shift, and hyper-resonance to percussion may be difficult to appreciate (Butler et al., 1996). Accordingly, the 1996 TCCC guidelines called for aggressive presumptive diagnosis and treatment for suspected tension pneumothorax in the prehospital combat environment: "Consider tension pneumothorax and decompress if a casualty has unilateral penetrating chest trauma and progressive respiratory distress." The 2003 and 2006 guidelines modified this slightly to include blunt torso trauma and respiratory distress even if it not progressive as part of the indication for needle thoracostomy: "Consider tension pneumothorax and decompress with needle thoracostomy if a casualty has torso trauma and respiratory distress" (McSwain et al., 2003; McSwain, 2006) (Table V).

Chest tubes are not recommended in this phase of care because: (1) They are not needed to provide initial treatment for a tension pneumothorax; (2) They are more difficult and time consuming for relatively inexperienced medical personnel to perform, especially in the austere battlefield environment; and (3) Chest tube insertion is probably more likely to cause additional

tissue damage and subsequent infection than needle thoracostomy (Butler et al., 1996). In a study by Holcomb et al. (2005b), needle thoracostomy using a 14-gauge needle or Cook catheter was just as successful as tube thoracostomy for relieving tension hemopneumothorax.

The potential for serious complications from needle thoracostomy exists (Butler et al., 2003). Some authors have suggested that needle thoracostomy may not be indicated in civilian prehospital trauma patients because it is often ineffective and may be overused (Cullinane et al., 2001). Other authors disagree, emphasizing that there is evidence that it can be done successfully with low complication rates (Barton et al., 1995; Eckstein and Suyehara, 1998; Heng et al., 2004; Davis et al., 2005; Massarutti et al., 2006). One study of 55 patients found a significant improvement in oxygen saturation with no major complications and no recurrence of tension pneumothorax (Massarutti et al., 2006).

Although there are fewer chest wounds in U.S. casualties now that body armor is routinely worn (Mabry, 2000), the ability to manage tension pneumothorax remains a skill of great importance to the combat medic. There are still wounds to the torso from shrapnel fragments and bullets entering either laterally, between the ceramic plates of the body armor, or from above or below the protected areas. Additionally, medics and corpsmen may be called upon to treat both civilian casualties and wounded prisoners of war who did not have the protection of body armor. Needle thoracostomy is also needed for those instances where tension pneumothorax occurs in noncombat settings (Brimms, 2004; Vinson, 2004). Longer delays to definitive care, the potential for worsening of tension pneumothorax in aeromedical transport as ambient pressure is lowered, and the potentially deleterious effects of hypobaric hypoxia in operations at altitude all strengthen the case for this skill to be retained by combat medics.

McPherson et al. (2006) recently published a retrospective analysis of tension pneumothorax from the analysis of U.S. fatalities in Vietnam and reported that this injury was the cause of death in three to four percent of fatally wounded combat casualties in that conflict, making it the second leading cause of preventable death (behind exsanguination from extremity injuries) on the battlefield.

There have been at least two instances of suspected tension pneumothorax in U.S. casualties reported in the GWOT to date. Westmoreland described the successful needle decompression of a suspected tension pneumothorax in OIF using a 14-gauge, 3.5-inch needle (Butler et al., 2006; Appendix 7). Another case report by a former Navy SEAL corpsman documented the successful decompression of a tension pneumothorax suffered by a Marine officer during OIF (NOMLLC Lesson Learned 41655).

Holcomb et al.'s (2007a) retrospective analysis of the first 82 special operations fatalities in the GWOT found that one special operations operator made a fast-rope insertion that resulted in a 25-foot fall onto rocky mountainous terrain. The fall caused a closed head injury and bleeding from multiple thoracic, intra-abdominal, and retroperitoneal sites. The bleeding sites were felt to have been relatively minor and probably not requiring surgical intervention. This individual was also found to have a tension pneumothorax. The time from injury to death for this casualty was 4.5 hours. This casualty might possibly have been saved had a needle thoracostomy been performed by a medic in the field, although it cannot be said with certainty that the individual would not have died from the closed head injury alone.

The questions to answer when discussing needle thoracostomy on the battlefield include the following: (1) Who should be trained to do the procedure: just combat medics or should nonmedical combatants be taught this skill as well? (2) What are the best clinical indicators for deciding who should be treated for a tension pneumothorax on the battlefield? (3) Should the

second intercostal space in the mid-clavicular line remain the preferred location or should the lateral approach be used as suggested by Heng et al.(2004)?(4) What is the best way to train for this procedure? (5) What gauge and length of needle should be used?

Previous recommendations were for a cannula 3- to 6-centimeter (cm) long for needle thoracostomy. Chest wall thickness in the second intercostal space in the mid-clavicular line ranged from 1.3 to 5.2 cm in 54 patients. The authors recommended that the shortest cannula length used for this procedure be 4.5 cm and that an unsuccessful attempt at needle thoracostomy be followed by attempt with a longer cannula or chest tube (Britten and Palmer, 1996; Britten et al., 1996). Another study found a mean chest wall thickness of 4.24 cm and noted that a catheter length of 5 cm would reliably penetrate the pleural space of only 75 percent of patients (Givens et al., 2004). Westmoreland reported success with a 14-gauge, 3.25-inch needle in treating tension pneumothorax in a casualty scenario in Afghanistan (Butler et al., 2006).

The U.S. Army recognized the need to train individuals who are not medics in additional skills beyond those that every combatant should possess. The Combat Lifesaver Program was adopted by the Marine Corps, as well. Needle thoracostomy is one of four skills (the others being starting an intravenous line, performing fluid resuscitation when indicated, and traction splinting) that the TCCC guidelines recommends be taught to combat lifesavers but not to all combatants. Deciding what percentage of individuals in a unit should be trained to this higher skill level is not addressed by the PHTLS manual but is left up to the military organizations considering this decision (McSwain and Salome, 2006).

Intravenous Access and Intraosseous Infusion Devices

TCCC recommends a more conservative approach to establishing prehospital intravenous (IV) access than civilian practice. TCCC recommends this intervention during the Care Under Fire and Tactical Field Care phases only when fluid resuscitation is indicated or if IV medications are required. There are several reasons not to start an IV if there is not a good indication: (1) Starting an IV takes time and may interfere with the unit's tactical flow or with the medic's ability to treat other casualties (2) Using IV fluids for individuals who do not need them makes them unavailable for subsequent casualties who may need them badly. In the words of a special operations medic: "Don't waste time on lines to conscious wounded with stable BPs," (Butler et al., 2006; Appendix 9). Conservation of IV fluids is also a reason for the recommendation to start a saline lock if it is believed that IV access is warranted. Two other points in favor of saline locks versus routine initiation of IV fluids are the increased ease of moving casualties when one is not required to manage IV bags and lines and the reduced risk of traumatic IV disinsertion as a result of the IV line snagging on something during patient movement. These innovations have been well received by the combat medic community and are now in common practice.

Fluid resuscitation for hemorrhagic shock is a clear indication for IV access on the battlefield, but the peripheral vasoconstriction that accompanies shock makes IV access more difficult. Previously used measures such as venous cutdown procedures are time-consuming and not well suited for the battlefield. Intraosseous (IO) infusion devices provide quick, reliable intravascular access when peripheral IVs cannot be started (Dubick and Holcomb, 2000; LaRocco and Wang, 2003; Johnson et al., 2005; Isbye and Nielson, 2006). In a study published in 2000, the Pyng FAST1 (Pyng Medical Corp., Richmond, BC, Canada) was given the best rating by special operations combat medics and corpsmen who participated in the trials (Calkins et al., 2000). The 2003 TCCC guidelines added the recommendation for combat medics to carry and be trained in the use of IO infusion devices. After a review of the available IO devices, the CoTCCC concluded that the Pyng FAST1 is the IO device best suited for trauma care on the battlefield (McSwain et al., 2003; McSwain and Salome, 2006).

IO devices have proven successful in combat based on input from combat medics (Butler et al., 2006). There were four successful uses of the FAST1 in casualties reported by three providers in a recent military medical lessons learned forum (Jarvis et al., 2007). IO access has also been found to be a very successful adjunct in establishing IV access in simulated chemical warfare casualty scenarios (Ben-Abraham et al., 2003; Vardi et al., 2004). In one first responder opinion favoring a device other than the Pyng FAST1, Briggs stated that: “The Bone Injection Gun has been more user friendly than the FAST1 and is easier to remove” (Butler et al., 2006; Appendix 9). Another report on the prehospital use of IO devices in civilian settings highlights the need for adequate training before using them in the field (Miller et al., 2005).

Practical experience with these devices has emphasized the need to use a syringe to eject the plug present in the lumen of the device after insertion. Use of human volunteers to conduct practice insertions of the device is not recommended for training in this device (Brown, 2005a).

Fluid Resuscitation

The 1996 TCCC guidelines suggested a somewhat different approach to IV fluid resuscitation in tactical settings than was practiced at the time in the civilian sector. Giving a fluid bolus to individuals who are not in shock is not necessarily helpful to the casualty and may be harmful if it delays treatment of other serious injuries, causes a delay in the unit’s tactical flow, or causes fluids to not be available to individuals who truly need fluid resuscitation. The most clear-cut indication for fluid resuscitation in the field is severe hemorrhage that has been controlled but resulted in shock before hemostasis was established (Butler et al., 1996). For individuals with uncontrolled hemorrhage, the best available data at the time found that prehospital fluid resuscitation increased the mortality rate for individuals with penetrating torso trauma and shock when compared with fluid resuscitation that was postponed until the time of operative intervention (Bickell et al, 1994).

For individuals requiring fluid resuscitation in the prehospital setting, hetastarch was recommended over crystalloid solution because of its much longer intravascular presence after administration, preventing both extravascular fluid overload and the need for additional fluid administration in cases of delayed evacuation (Butler et al., 1996).

The USSOCOM-sponsored workshop on the “Management of Urban Warfare Casualties” in 1998 produced the first change to these recommendations. Despite the results of Bickell’s study noted above, trauma experts believed that fluid resuscitation is indicated for individuals who are unconscious or who have altered mental status as a result of hypovolemic shock. The opinion of the panelists was unanimous on this point and was echoed by a conference on this topic jointly sponsored by the U.S. Army Medical Research and Materiel Command and the Office of Naval Research (Holcomb, 2003). This conference produced the hypotensive resuscitation strategy for individuals with decreased state of consciousness or unconsciousness recommended in the 2003 and 2006 TCCC guidelines. Hextend (Hospira, Inc, Lake Forest, IL) is recommended instead of the previously recommended Hespan (B. Braun Medical, Irvine, CA) because of a possible decreased incidence of coagulopathy with Hextend (Holcomb, 2003; McSwain et al., 2003). The current recommendation for casualties in shock during Tactical Field Care is an initial infusion of 500 cc of Hextend, followed by 30 minutes of observation. If unsatisfactory clinical improvement is noted, an additional 500 cc of Hextend is given.

The rationale for this hypotensive resuscitation strategy using Hextend as the resuscitation fluid has been reviewed several times in recent years and found to be sound from the research literature (Holcomb, 2005a; Donham and Otten, 2006). In recent studies with animal models of severe hemorrhage in which definitive repair of the injury has not been accomplished,

hypotensive resuscitation is more effective than normotensive resuscitation in maintaining hemostasis (Sondeen et al., 2003a; Handrigan et al., 2005). The premise that resuscitation with Hextend provides better sustained effect with smaller fluid volume than crystalloid has also been confirmed in animal models (Handrigan et al., 2005).

Another innovation produced by the 2003 guidelines allows individuals who were able to take oral fluids. Trauma surgeons on the committee pointed out that dehydration was a common and significant problem in the care of combat casualties and recommended this change (McSwain and Salome, 2006).

The 2006 guidelines also included a caveat to the hypotensive resuscitation strategy mentioned previously that calls for more aggressive fluid resuscitation in individuals with traumatic brain injury (TBI) and decreased radial pulse, reflecting the need to maintain cerebral perfusion in individuals who may have increased intracranial pressure (Table V).

Tarpey (2005), in his OIF experience with hypotensive resuscitation using Hespan, reports: “We adhered throughout to the principle of hypotensive resuscitation, using IV fluids only when appropriate. Casualties not in shock were encouraged to take fluids orally. Those casualties in shock received 1,000 cc of Hespan, the colloid available to us. It was very effective in resuscitating casualties without complications noted. Given our low supplies and little room to transport everything throughout the length of Iraq, we found colloids to be the better choice of fluid for resuscitation.” Westmoreland reported success on the battlefield with hypotensive resuscitation as well: “Works well in combat—7 of 8 U.S. critical survived 5+ hours on the ground and 3 to 4 hours for CASEVAC. Titration to mentation seemed to work well in most cases” (Butler et al., 2006).

Battlefield Antibiotics

The use of antibiotic prophylaxis in patients with significant trauma and open wounds is routine in the hospital setting. Early administration is preferred over delayed use. In the tactical prehospital setting, transport to the hospital may be delayed for many hours (Bowden, 1999; Naylor, 2005.) The use of cefoxitin was recommended in the initial TCCC guidelines. This agent provides broad-spectrum coverage, is relatively inexpensive, and requires IV or intramuscular (IM) administration (Butler and Smith, 1996; Butler et al., 1996).

The 2003 guidelines included a recommendation that oral antibiotics be used in casualties able to take them (O'Connor and Butler, 2003). Oral antibiotics do not require mixing and IV/IM administration by the medic, thus decreasing both the medic's administration time and load. The fourth-generation fluoroquinolones are broad-spectrum agents with excellent bioavailability when taken by mouth. Gatifloxacin and moxifloxacin were found to be similar in efficacy in a literature review, and gatifloxacin was recommended based on pricing at the time (O'Connor and Butler, 2003). Additionally, for casualties unable to take medications by mouth, cefotetan was recommended as a longer-acting alternative to cefoxitin with similar spectrum and cost (O'Connor and Butler, 2003).

In the interim between the 2003 and 2006 guidelines, cefotetan became difficult to procure. A search for a suitable alternative produced a recommendation to use ertapenam instead (McSwain and Salome, 2006). Also in this interim, significant dysglycemic side effects began to be reported with gatifloxacin, and this medication was withdrawn from the market. Moxifloxacin was selected as a suitable alternative for a broad-spectrum oral antibiotic (McSwain and Salome, 2006). The search for the ideal antibiotic will continue, with some authors recommending limited-spectrum antibiotics based on the bacteriology of wounds on presentation (Murray et al.,

2006) and others advocating a more broad-spectrum choice (Hell, 1991; O'Connor and Butler, 2003; Kucisek-Tepes et al., 2006).

The use of prophylactic antibiotics is recommended as part of the hospital management of war wounds (Burns et al., 2004; Mazurek and Ficke, 2006; Starnes et al., 2006). Antibiotics must be given early after the injury to be effective (Mellor et al., 1996). In military operations, evacuation is often delayed, and if antibiotics are to be successful, they must be administered by the medics. The consequences of not doing so are reflected in the relatively high rate of wound infections reported by Mabry et al. (2000) in Mogadishu (16 of 58 casualties wounded in action [WIA]), where the evacuation of most of the casualties was delayed for 15 hours and antibiotics were not administered by the medics. The authors of that article called for antibiotics to be administered by combat medics in the field.

Tarpey (2005) reported his experience with antibiotics given in the prehospital setting in OIF. In contrast with the experience in Mogadishu, all of Tarpey's OIF casualties (32) with open wounds received antibiotics in the field, and none of them developed wound infections. They chose their antibiotics based on the TCCC recommendations as modified by medication availability, using levofloxacin for an oral antibiotic, IV cefazolin for extremity injuries, and IV ceftriaxone for abdominal injuries.

Westmoreland described the results of battlefield antibiotic use in one casualty scenario involving 19 Ranger and special forces WIA as well as 30 Iraqi WIA and reported a "negligible" incidence of wound infections in this group (Butler et al., 2006).

A search of the NOMLLC Lessons Learned revealed no entries describing first responder experiences with the use of battlefield antibiotics.

Battlefield Analgesia

The initial recommendations in the TCCC guidelines on battlefield analgesia called for the use of IV rather than IM morphine because of the more rapid onset of action and increased ease of titration (Butler and Smith, 1996; Butler et al., 1996). The 2003 recommendations maintained this recommendation and added the oral, nonopiate analgesic Vioxx as an option for less severe pain. Vioxx, a cyclooxygenase 2 inhibitor, was chosen over other nonsteroidals primarily because it did not interfere with platelet function, as aspirin and cyclooxygenase 1 nonsteroidal anti-inflammatory drugs do (McSwain et al., 2003). This medication was subsequently withdrawn from the market because of cardiovascular problems associated with long-term use. The 2006 guidelines therefore substituted meloxicam and added extended-release acetaminophen for oral analgesia for those individuals in a combat setting with relatively minor wounds who can continue to perform effectively in their unit as long as they are not given narcotics for analgesia. Use of opiate analgesia in these individuals is undesirable because they may be rendered non-battleworthy by their treatment when they were not incapacitated by the wounds (McSwain and Salome, 2006).

Another addition to battlefield analgesia in the 2006 guidelines was oral transmucosal fentanyl citrate (OTFC). The successful use of this medication in OIF combat operations was first described in Army Rangers in 2004 (Kotwal et al., 2004). Fentanyl lozenges were used in 22 hemodynamically stable trauma patients who had no other indications for an IV other than pain management. OTFC at a dose of 1,600/ig was found to be successful in relieving pain and to have a sustained effect up to five hours after dosing. There was one episode of hypoventilation requiring treatment with naloxone that led the authors to recommend that future use entail lower dosing of OTFC with additional titration as required. The current TCCC guidelines call for an

initial dose of 800/ig of OTFC, with an additional dose in 15 minutes if required. A recent review of pain management in austere environments stated that: “Overall OTFC appears to be ideal for administering safe, rapid-onset oral opiate analgesia in the prehospital austere setting” (Wedmore et al., 2006a,b).

Oxygen Administration and Patient Monitoring on the Battlefield

Oxygen is routinely administered to patients with significant trauma in the civilian prehospital setting. It is much less available on the battlefield, especially in the phases of care before CASEVAC care. The 1996 guidelines called for oxygen to be administered to seriously injured patients during CASEVAC (Butler and Smith, 1996; Butler et al., 1996).

TCCC guidelines are now more precise in this area and state that most casualties do not require oxygen during CASEVAC, but that supplemental oxygen should be administered for the following indications: low oxygen saturation by pulse oximetry; injuries associated with impaired oxygenation; unconscious casualties; TBI patients (maintain oxygen saturation >90); casualties in shock; and casualties at altitude (Grissom et al., 2006; McSwain and Salome, 2006).

A review of the literature from Iraq and Afghanistan found no reports that provide specific evidence relating to the effect of these recommendations on casualty survival, but the study by Grissom et al. (2006) noted that the above provides a solid foundation on which to base this guideline.

It is now recommended that combat medics routinely carry pulse oximeters to provide a ready way to determine oxygen saturation. Pulse oximetry is an excellent tool for medics in the field to monitor oxygen desaturation and determine whether or not a lifesaving intervention such as a surgical airway or needle thoracostomy is indicated. It will also monitor the effects of these interventions. Westmoreland described a multiple casualty scenario in Afghanistan in which he states that “pulse oximetry was key in rapid/constant triage” (Butler et al., 2006).

Blood Products on the Battlefield

The use of blood products in the prehospital setting was not addressed in the original TCCC article. The 2003 guidelines recommended that packed red blood cells (PRBCs) be available on CASEVAC platforms when logistically feasible. This recommendation has been carried forward into the 2006 guidelines with more specific guidance on when to use type 0 PRBCs and how much to administer. There has been at least one report of the use of blood products (PRBCs) in the CASEVAC phase of care (West et al. 2004). The author of that article makes the point that only one unit was transfused and that this single unit may not have been lifesaving, but it demonstrates the feasibility of carrying and administering PRBCs on CASEVAC platforms. The practice of battlefield transfusions from Soldier-to-Soldier is still seen occasionally, but this has been discouraged in the guidelines because of the time and logistics involved on the battlefield, concerns about ensuring donor compatibility, and the fact that this procedure leaves the donor(s) hypovolemic after the procedure in a tactical environment where they could be the next person(s) shot.

Hypothermia on the Battlefield

The first two sets of TCCC guidelines contained no mention of the management of hypothermia on the battlefield. The hypovolemic shock seen in trauma patients, however, both predisposes the casualty to hypothermia and is potentially worsened by the coagulopathy that ensues from hypothermia (Fries et al. 2002; Carr, 2004; Eastridge et al., 2006). Hypothermia-induced

coagulopathy is well described and results from decreases in platelet function (Watts et al., 1998; Peng and Bongard, 1999; Wolberg et al., 2004), coagulation cascade enzyme activity slowing (Watts et al., 1998; Peng and Bongard, 1999), and alterations of the fibrinolytic system (Peng and Bongard, 1999). Hypothermia is a problem even in relatively warm climates, because the presence of hypovolemia causes decreased ability to produce heat and to maintain normal body temperature. This problem is exacerbated by aircraft-based CASEVAC, where the casualty is exposed to cooler temperatures and significant wind chill at altitude during a rotary-wing evacuation in an open-cabin airframe.

Hypothermia has been found in recent years to be more prevalent than generally realized and was found to independently contribute to overall mortality (Arthurs et al., 2006). The importance of instituting aggressive steps to prevent hypothermia in the field has been emphasized (Peng and Bongard, 1999; Husum et al., 2002), and simple interventions have been demonstrated to be effective in decreasing the incidence of hypothermia in prehospital settings with prolonged evacuation (Husum et al., 2002). A number of specific interventions have been recommended in the 2006 TCCC guidelines to prevent hypothermia in combat casualties (McSwain and Salome, 2006). These interventions reflect the guidance on this topic provided by the Assistant Secretary of Defense for Health Affairs (Winkenwerder, 2006). These measures have only recently been put in place, and no metrics are currently available to document their efficacy in the current conflict. The article by Arthurs et al. (2006), however, clearly shows that hypothermia is an independent predictor of mortality in combat casualties in OIF.

Combining Good Medicine with Good Tactics

One of the most difficult aspects of TCCC to quantify and yet one of the most important to capture has been the impact of integrating tactically appropriate trauma care into the unit's tactical flow during combat.

One of the best illustrations of this principal is the description of the remarkably successful Israeli raid on the Entebbe airport where a number of hostages were rescued (McRaven, 1996). The rescue force landed on the darkened airfield at Entebbe and conducted a successful approach to the terminal where the hostages were being held. At the onset of the assault phase of the operation, however, the commander of the assault force sustained a gunshot wound to the chest. Rather than stopping the operation and focusing on the medical care of the commander, the assault force continued the tactical flow of the assault. The rapid-sequence rescue resulted in the successful rescue of all hostages with no loss of hostage lives. The assault took less than two minutes, after which the assaulters were then able to care for the commander after the terminal had been secured. A stark contrast to this operation was the rescue attempt on May 4, 1974, in the Israeli village of Ma'alot. The assault phase of this operation was not successful in killing the three terrorists before they opened fire on their 105 hostages. The result was 22 killed and 56 wounded; most of the victims were school children (McRaven, 1996).

Another compelling look at a real-world casualty scenario is described by Naylor (2005) in his account of Operation Anaconda in Afghanistan and, in particular, the action on Takur Ghar (Roberts Ridge) in which a helicopter full of Rangers was sent to provide reinforcement to a Navy SEAL element in contact with al-Qaeda fighters. The helicopter was hit by rocket fire as it landed and then came under heavy small-arms fire. There were multiple casualties to be cared for, but the intense, ongoing tactical situation dictated that only care absolutely necessary to save lives be rendered while the engagement was ongoing.

The actions described above illustrate the high cost of failure to give the tactical situation the appropriate priority when a combat unit takes casualties. More casualties, captures, or deaths

among unit members may result if casualty care takes inappropriate precedence over tactical considerations before the engagement is concluded. For this reason, the appropriate care while under fire that achieves both the best long-term result for those already wounded as well as preventing further injury to other team members is often stated as “accurate return fire.”

Comprehensive Metrics

To this point, this section has presented reports of the experience to date of individual elements of care recommended by the TCCC guidelines. The following discussion will examine the larger-scale metrics currently available for TCCC.

One important metric is an expanding scope of users. At the time of this writing, TCCC is used by all of the conventional forces in the U.S. military as well as by SOF (Allen et al., 1999; Brown, 2005c; Hostage, 2005; Holcomb, 2005a; Kiley, 2005a,b; BUMED message 111622Z, 2006 December 2006; USCG message 221752Z November 2006; USMC message 020004Z August 2006).

Holcomb (2005a) noted that TCCC was initially used only by SOF, but because of its straightforward instructions and applicability, it is now used by most conventional forces. It is currently the standard for medic training in the U.S. armed services.

This general acceptance of the principles of TCCC has come about as positive reports concerning the efficacy of TCCC have come in from GWOT battlefields. Eastridge et al. (2006), in their discussion of the newly developed Theater Trauma System state: “Other courses such as Tactical Combat Casualty Care, Emergency War Surgery, and the Joint Forces Combat Trauma Management Course have revolutionized the way medical providers are trained for wartime deployment.”

Published observations of individuals or units who have used the TCCC guidelines in combat are available. Tarpey (2005) described the use of TCCC by elements of the 3rd Infantry Division: “The adoption and implementation of the principles of TCCC by the medical platoon of Task Force 1-15 Infantry in OIF 1 resulted in overwhelming success. Over 25 days of continuous combat with 32 friendly casualties, many of them serious, we had 0 KIA [killed in action] and 0 died of wounds, while simultaneously caring for a significant number of Iraqi civilian and military casualties.”

The 101st Airborne Division stated that “by teaching and using (TCCC) ideas, the 101st has achieved one of the highest casualty survival rates in combat of any unit in the Army” (Gresham, 2005).

An article in *Tip of the Spear*, the official publication of USSOCOM, stated, “Multiple reports from SOF First Responders have credited TCCC techniques and equipment with saving lives on the battlefield” (Bottoms, 2006). The USSOCOM commander sent a letter of appreciation to the Army Surgeon General for the outstanding work done by the USAISR in establishing a pilot program to fast-track new TCCC training and equipment to deploying special operations units and then collect data about the success of these measures. This letter stated that these efforts had “. . . produced remarkable advances in our force’s ability to successfully manage battlefield trauma” (Brown, 2005b).

A team from Madigan Army Medical Center used TCCC-based training to prepare 1,317 combat medics for deployment to Iraq or Afghanistan. Of the 140 medics who subsequently deployed to

Iraq for 1 year, “99% indicated that the principles taught in the TCCC course helped with the management of injured casualties during their deployment” (Sohn et al., 2006).

In a presentation to the Special Operations Medical Association in December 2005, a senior enlisted medic in an Army special forces unit who has had extensive experience with using TCCC to treat combat casualties made the following recommendation: “Implement TCCC into all service medical training now (Butler et al., 2006).

The article by Holcomb et al. (2006) on combat casualties in Iraq and Afghanistan documented that American forces in this conflict are experiencing the highest casualty survival rate in U.S. history. They identify four major factors as being responsible for this major achievement: (1) faster evacuation times, (2) TCCC, (3) better trained medics, and (4) better personal protective equipment.

In an article examining the causes of death in the first 82 special operations fatalities in the GWOT, Holcomb et al. (2005a) found that two-thirds of the 12 fatalities whose wounds were potentially survivable might have been saved by proper application of TCCC principles.

Current Challenges

Rapid transition of new TCCC techniques and technology

All services in the U.S. military have, in principle, adopted the TCCC recommendations. To expedite the rapid transition of new technologies and management strategies to U.S. combatants, methods to ensure that deploying units have just-in-time equipping and training must be developed. Repeated reports from the battlefield emphasize the need to ensure that troops on the battlefield have not just the latest trauma care equipment, but also the framing to use it successfully. The USSOCOM/USAISR TCCC Transition Initiative is one successful model of such a transition strategy (Butler and Holcomb, 2005), but others may serve as well.

TCCC training for nonmedical personnel and combat lifesavers

Trauma care on the battlefield has historically been combat medic-centric, but many lifesaving interventions can and should be carried out by the casualties themselves and their nonmedical teammates. The challenge is to find the optimum strategy for ensuring that units on the battlefield have the right combination of medical skills distributed throughout unit personnel to maximize the probability that casualties will receive all of the life-saving care required as quickly as possible. Combat units need to determine the mix of the three levels of TCCC training—nonmedical combatants, combat lifesavers, and combat medical personnel—that best serves their particular missions. There is a particular need to teach the TCCC concepts to tactical mission commanders and senior noncommissioned officers who will have to direct their unit’s actions in a casualty scenario. Both Navy SEALs and Army Rangers have incorporated this item into their leadership training (Butler, 2001; Jarvis et al., 2007).

TCCC training for deploying physicians

Physicians in medical treatment facilities need to become familiar with the TCCC guidelines, since they may differ substantially from treatment methods used in the medical treatment facility. TCCC is a topic not addressed in medical school curricula, and there is currently no program to assure that all deploying physicians are familiar with this approach to battlefield trauma care. If this familiarity does not exist, inappropriate direction and feedback may be given to front-line providers.

Documenting feedback from the battlefield

First-responder feedback is critical to adjusting the TCCC guidelines based on current experiences. Although physicians and physician assistants have historically provided at least some formal feedback in the way of published case reports and case series, feedback from combat medical personnel has been limited and essentially absent from nonmedical first responders. The recently established Joint Theater Trauma System (Eastridge et al., 2006) has made major advances in trauma care in the CENTCOM theater of operations. The trauma registry established as part of this effort could potentially address this issue successfully, but other methods of obtaining accurate, timely, first-responder input on how new TCCC equipment and strategies are working on the battlefield must be pursued as well. The TCCC Transition Initiative had some success in this area, but the data collected from returning combat medical personnel was limited due to collection methodology, concerns for operational security, and medic availability. The first responder forums conducted by senior enlisted leaders in the combat medical community, such as those organized by SGM Harold Hill, MSG Ted Westmoreland, and MSG Harold Montgomery and presented at the last three Special Operations Medical Association conferences are excellent sources of input that should be encouraged and developed (Butler et al., 2006).

CoTCCC resourcing

Since 2001, the CoTCCC has been the body responsible for updating the TCCC guidelines. With the expanding use and documented success of these guidelines, the function of this committee becomes increasingly important, especially because accounts of battlefield experiences will be forthcoming from the present conflict for several years to come. This information needs to be assimilated and the guidelines adjusted as appropriate. This step will be an ongoing, all-service effort that should be funded at an appropriate level. The CoTCCC leadership is working to secure the resources necessary to meet the demands generated by the success of the TCCC guidelines to date.

Optimal TCCC training strategies

Presently, there are a number of military and civilian courses that teach TCCC. The relative strengths and weaknesses of each course have not been well defined. Sohn et al.'s report (2006) of the four-day program at Madigan noted that classroom scenarios, simulators, and live tissue were all part of the framing. The authors stressed the importance of the live tissue framing in overcoming the "frozen in place" reaction observed by the instructors in many of the course attendees when confronted for the first time with seemingly uncontrollable hemorrhage from a proximal femoral artery injury. The importance of live tissue training in preparing medics to care for combat casualties was also stressed by the presenters at a recent military lessons learned conference (Jarvis et al., 2007) and in first-responder forums (Butler et al., 2006). Carefully defining exactly what injuries to treat and what procedures to perform is an essential element of optimizing live tissue training. Establishing a surgical airway is probably the procedure for which live tissue training is most beneficial. Other procedures for which live tissue framing may be particularly helpful include applying tourniquets and hemostatic dressings, needle thoracostomy, chest tube insertion, and using direct pressure to stop severe bleeding (Brown, 2005a).

TCCC courses currently in use range from 2 to 11 days. The best combination of training techniques and the most cost efficient methods of presenting TCCC concepts and skills remains to be determined, and TCCC courses may have to be customized for various units' particular needs.

Future Issues

New techniques and technologies may offer great opportunities for improving combat trauma care in the future. The CoTCCC should monitor the success of all currently recommended management strategies as additional information becomes available and identify areas where modifications are needed or further research is necessary.

Modified configurations of the currently used HemCon and QuikClot have recently become available (ChitoFlex and the QuikClot Advanced Clotting Sponge.) In addition, a number of promising new hemostatic agents are available. The hemostatic agent options for first responders need to be reevaluated in a comparative trial using appropriate animal models.

Recombinant factor VIIa has been a useful adjunct to stopping uncontrolled bleeding in animal models (Howes et al., 2007) and in medical treatment facilities (Martinowitz et al., 2004; Holcomb, 2005b). This agent may have a role in certain selected prehospital settings in military operations, especially those in areas such as Afghanistan, where evacuation times are often much longer than those in Iraq. The two most promising interventions for avoiding preventable deaths in the study by Holcomb et al. (2007a) besides proper performance of TCCC were faster CASEVAC and/or an IV hemostatic agent. The deployment strategy and the indications for the potential use of factor VIIa in the prehospital setting would both need to be carefully defined.

Optimum prehospital resuscitation strategies may continue to evolve. Hemoglobin-based oxygen carrying resuscitation fluids may become available in the near term. If they are approved by the FDA, the relative merits of these agents as compared to the current Hextend resuscitation strategies should be evaluated. The aggressive administration of fresh frozen plasma in a 1:1 ratio with PRBCs has been shown to decrease mortality dramatically in a hospital setting (Holcomb et al., 2007b), and this modality may have a place in selected prehospital settings. Department of Defense researchers are pursuing a comprehensive approach to fluid resuscitation that will address the multiple factors that must be considered, including preventing or reversing coagulopathies, oxygen-carrying considerations, duration of effect, and preventing iatrogenically-induced rebleeding (Holcomb et al., 2007b). The principles and technologies that ensue from these investigations will apply mostly to care in medical treatment facilities but may be useful in some prehospital settings.

A common problem on the battlefield is managing severe pain in a casualty who is in shock or in danger of going into shock. Morphine and fentanyl are effective analgesics but are also cardiorespiratory depressants. Intranasal or IV ketamine or other medications that provide analgesia without depressing respiration and circulation should be evaluated for use by combat medics.

Tactical Combat Casualty Care Guidelines

July 2008

* Changes from the TCCC guidelines published in the 2006 Sixth Edition of the Prehospital Trauma Life Support Manual are shaded.

Care Under Fire

Basic management plan:

- Return fire and take cover.
- Direct or expect casualty to remain engaged as a combatant if appropriate.
- Direct casualty to move to cover and apply self-aid if able.
- Try to keep the casualty from sustaining additional wounds.
- Airway management is generally best deferred until the Tactical Field Care phase.
- Stop life-threatening external hemorrhage if tactically feasible:
 - Direct casualty to control hemorrhage by self-aid if able.
 - Use a CoTCCC-recommended anatomically amenable tourniquet to control hemorrhage.
 - Apply the tourniquet proximal to the bleeding site (over the uniform), tighten tourniquet, and move the casualty to cover.

Tactical Field Care

Basic management plan:

- Casualties with an altered mental status should be disarmed immediately.
- Airway management:
 - Unconscious casualty without airway obstruction:
 - * Chin lift or jaw thrust maneuver.
 - * Nasopharyngeal airway.
 - * Place casualty in recovery position.

- Casualty with airway obstruction or impending airway obstruction:
 - * Chin lift or jaw thrust maneuver.
 - * Nasopharyngeal airway.
 - * Allow casualty to assume any position that best protects the airway, to include sitting up.
- Place unconscious casualty in recovery position.

If previous measures unsuccessful, initiate surgical cricothyroidotomy (with lidocaine if conscious)

Breathing: In a casualty with progressive respiratory distress and known or suspected torso trauma, consider a tension pneumothorax and decompress the chest on the side of the injury with a 14-gauge, 3.25 inch needle/catheter unit inserted in the second intercostal space at the midclavicular line. Ensure that the needle entry into the chest is not medial to the nipple line and is not directed towards the heart.

All open and/or sucking chest wounds should be treated by immediately applying an occlusive material to cover the defect and securing it in place. Monitor the casualty for the potential development of a subsequent tension pneumothorax.

Bleeding: Assess for unrecognized hemorrhage and control all sources of bleeding. If not already done, use a CoTCCC-recommended anatomically amenable tourniquet to control life-threatening external hemorrhage for any traumatic amputation. Apply directly to the skin 2-3 inches above wound.

For compressible hemorrhage not amenable to tourniquet use or as an adjunct to tourniquet removal (if evacuation time is anticipated to be longer than two hours), use Combat Gauze as the hemostatic agent of choice with WoundStat as the backup (if the primary agent is not successful at controlling the hemorrhage or if the wound characteristics call for a granular agent). Both agents should be applied with at least three minutes of direct pressure.

Before releasing any tourniquet on a casualty who has been resuscitated for hemorrhagic shock, ensure a positive response to resuscitation efforts (i.e., a peripheral pulse normal in character and normal mentation if there is no TBI:

Reassess prior tourniquet application. Expose wound and determine if tourniquet is needed. If so, move tourniquet from over uniform and apply directly to skin 2-3 inches above wound. If tourniquet is not needed, use other techniques to control bleeding.

When time and the tactical situation permit, conduct a distal pulse check. If a distal pulse is still present, consider additional tightening of the tourniquet or the use of a second tourniquet, side by side and proximal to the first, to eliminate the distal pulse.

Expose and clearly mark all tourniquet sites with the time of tourniquet application. Use an indelible marker.

Intravenous (IV) access: Start an 18-gauge IV or saline lock if indicated. If resuscitation is required and IV access is not obtainable, use the IO route.

Fluid resuscitation: Assess for hemorrhagic shock. Altered mental status (in the absence of head injury) and weak or absent peripheral pulses are the best field indicators of shock.

If casualty is not in shock:

- No IV fluids necessary.
- *Per Os* (PO) fluids permissible if casualty is conscious and can swallow.

If casualty is in shock:

- Hextend, 500-mL IV bolus.
- Repeat once after 30 minutes if still in shock.
- No more than 1000 mL of Hextend.

Continued efforts to resuscitate must be weighed against logistical and tactical considerations and the risk of incurring further casualties.

If a casualty with TBI is unconscious and has no peripheral pulse, resuscitate to restore the radial pulse.

Preventing hypothermia: If hypothermia is suspected:

- Minimize casualty's exposure to the elements. Keep protective gear on or with the casualty if feasible.
- Replace casualty's wet clothing with dry if possible.
- Apply Ready-Heat Blanket to casualty torso.
- Wrap casualty in Blizzard Rescue Blanket.
- Put Thermo-Lite Hypothermia Prevention System Cap on the casualty's head, under the helmet.
- Apply additional interventions as needed and available.
- If gear mentioned above is not available, use dry blankets, poncho liners, sleeping bags, body bags, or anything that will retain heat and keep the casualty dry.

Penetrating eye trauma: If a penetrating eye injury is noted or suspected:

- Perform a rapid field test of visual acuity.
- Cover the eye with a rigid eye shield (**not a pressure patch.**)
- Ensure the casualty takes the 400 mg moxifloxacin tablet in the combat pill pack if possible. If the casualty cannot take the oral moxifloxacin, administer IV/IM antibiotics as outlined below.

Monitoring: Pulse oximetry should be available as an adjunct to clinical monitoring. Readings may be misleading in the settings of shock or marked hypothermia.

Inspect and dress known wounds.

Check for additional wounds.

Provide analgesia as necessary:

- If able to fight, the following medications should be carried by the combatant and self-administered as soon as possible after the wound is sustained:
 - Mobic, 15 mg PO once a day
 - Tylenol, 650-mg bilayer caplet, 2 PO every 8 hours
- If unable to fight, (**Note:** Have naloxone readily available whenever administering opiates.)
 - Casualty does not otherwise require IV/IO access:
 - * Oral transmucosal fentanyl citrate (OTFC), 800 ug transbuccally.
 - * Recommend taping lozenge-on-a-stick to casualty's finger as an added safety measure.
 - * Reassess in 15 minutes.
 - * Add second lozenge in casualty's other cheek as necessary to control severe pain.
 - * Monitor for respiratory depression.
 - IV or IO access obtained:
 - * Morphine sulfate, 5 mg IV/IO.
 - * Reassess in 10 minutes.
 - * Repeat dose every 10 minutes as necessary to control severe pain.
 - * Monitor for respiratory depression.
 - * Promethazine, 25 mg IV/IM/IO every six hours as needed for nausea or for synergistic analgesic effect.

Splint fractures and recheck pulse.

Antibiotics (recommended for all open combat wounds): If able to take PO, moxifloxacin, 400 mg PO one a day. If unable to take PO (shock, unconsciousness): Cefotetan, 2 g IV (slow push over 3-5 minutes) or IM every 12 hours or Ertapenem, 1 g IV/IM once a day.

Communicate with the casualty if possible: Encourage, reassure, and explain care.

Cardiopulmonary resuscitation: Resuscitation on the battlefield for victims of blast or penetrating trauma who have no pulse, no ventilations, and no other signs of life will not be successful and should not be attempted.

Documentation of care: Document clinical assessments, treatments rendered, and changes in the casualty's status on a TCCC Casualty Card. Forward this information with the casualty to the next level of care.

Tactical Evacuation Care

* The new term "tactical evacuation" includes both CASEVAC and medical evacuation (MEDEVAC) as defined in Joint Publication 4-02, *Health Service Support in Joint Operations*

Basic management plan:

- Airway management:
 - Unconscious casualty without airway obstruction:
 - * Chin lift or jaw thrust maneuver.
 - * Nasopharyngeal airway.
 - * Place casualty in recovery position.
 - Casualty with airway obstruction or impending airway obstruction:
 - * Chin lift or jaw thrust maneuver.
 - * Nasopharyngeal airway.
 - * Allow casualty to assume any position that best protects the airway, to include sitting up.
 - Place unconscious casualty in recovery position.
- If above measures unsuccessful use Laryngeal Mask Airway (LMA)/intubating LMA, Combitube, endotracheal intubation, or surgical cricothyroidotomy (with lidocaine if casualty is conscious).

Note: Spinal immobilization is not necessary for casualties with penetrating trauma.

Breathing: In a casualty with progressive respiratory distress and known or suspected torso trauma, consider a tension pneumothorax and decompress the chest on the side of the injury with a 14-gauge, 3.25 inch needle/catheter unit inserted in the second intercostal space at the mid clavicular line. Ensure that the needle entry into the chest is not medial to the nipple line and is not directed towards the heart.

Consider chest tube insertion if no improvement and/or long transport is anticipated.

Most combat casualties do not require supplemental oxygen, but administration of oxygen may be of benefit for the following types of casualties:

- Low oxygen saturation by pulse oximetry
- Injuries associated with impaired oxygenation
- Unconscious casualty
- Casualty with TBI (maintain oxygen saturation > 90%)
- Casualty in shock
- Casualty at altitude

All open and/or sucking chest wounds should be treated by immediately applying an occlusive material to cover the defect and securing it in place. Monitor the casualty for the potential development of a subsequent tension pneumothorax.

Bleeding: Assess for unrecognized hemorrhage and control all sources of bleeding. If not already done, use a CoTCCC-recommended anatomically amenable tourniquet to control life-threatening external hemorrhage or for any traumatic amputation. Apply directly to the skin 2-3 inches above wound.

For compressible hemorrhage not amenable to tourniquet use or as an adjunct to tourniquet removal (if evacuation time is anticipated to be longer than two hours), use Combat Gauze as the hemostatic agent of choice with WoundStat as the backup (if the primary agent is not successful at controlling the hemorrhage or if the wound characteristics call for a granular agent.) Both agents should be applied with at least three minutes of direct pressure. Before releasing any tourniquet on a casualty who has-been resuscitated for hemorrhagic shock, ensure a positive response to resuscitation efforts (i.e., a peripheral pulse normal in character and normal mentation if there is no TBI).

Reassess prior tourniquet application. Expose wound and determine if tourniquet is needed. If so, move tourniquet from over uniform and apply directly to skin 2-3 inches above wound. If tourniquet is not needed, use other techniques to control bleeding.

When time and the tactical situation permit, a distal pulse check should be accomplished. If a distal pulse is still present, consider additional tightening of the tourniquet or the use of a second tourniquet, side by side and proximal to the first, to eliminate the distal pulse.

Expose and clearly mark all tourniquet sites with the time of tourniquet application. Use an indelible marker.

Intravenous (IV) access: Reassess need for IV access:

- If indicated, start an 18-gauge IV or saline lock.
- If resuscitation is required and IV access is not obtainable, use IO route.

Fluid resuscitation: Reassess for hemorrhagic shock (altered mental status in the absence of brain injury and/or change in pulse character.)

If not in shock:

- No IV fluids necessary.
- PO fluids permissible if conscious and can swallow.

If in shock:

- Hextend 500-mL IV bolus.
- Repeat once after 30 minutes if still in shock.
- No more than 1000 mL of Hextend.

Continue resuscitation with PRBCs, Hextend, or Lactated Ringer's solution (LR) as indicated.

If a casualty with TBI is unconscious and has a weak or absent peripheral pulse, resuscitate as necessary to maintain a systolic blood pressure of 90 millimeters of mercury or above.

Preventing hypothermia: If hypothermia is suspected:

- Minimize casualty's exposure to the elements. Keep protective gear on or with the casualty if feasible.
- Continue Ready-Heat Blanket, Blizzard Rescue Wrap, and Thermo-Lite Cap.
- Apply additional interventions as needed.
- If possible, use the Thermal Angel or other portable fluid warmer on all IV sites, .
- Protect the casualty from wind if doors must be kept open.

Penetrating eye trauma: If a penetrating eye injury is noted or suspected:

- Perform a rapid field test of visual acuity.
- Cover the eye with a rigid eye shield (**not a pressure patch**).
- Ensure the casualty takes the 400 mg moxifloxacin tablet in the combat pill pack if possible. If the casualty cannot take the oral moxifloxacin, administer IV/IM antibiotics as outlined below.

Monitoring: Institute pulse oximetry and other electronic monitoring of vital signs, if indicated.

Inspect and dress known wounds.

Check for additional wounds.

Provide analgesia as necessary:

- Able to fight:
 - Mobic, 15 mg PO once a day.
 - Tylenol, 650-mg bilayered caplet, 2 PO every 8 hours.
- Unable to fight: (**Note:** Have naloxone readily available whenever administering opiates).
 - Does not otherwise require IV/IO access:
 - * Oral transmucosal fentanyl citrate (OTFC) 800 ug transbuccally.
 - * Recommend taping lozenge-on-a-stick to casualty's finger as an added safety measure.
 - * Reassess in 15 minutes.
 - * Add second lozenge, in other cheek, as necessary to control severe pain.
 - * Monitor for respiratory depression.
 - IV or IO access obtained:
 - * Morphine sulfate, 5 mg IV/IO.
 - * Reassess in 10 minutes.
 - * Repeat dose every 10 minutes as necessary to control severe pain.
 - * Monitor for respiratory depression.
 - * Promethazine, 25 mg IV/IM/IO every six hours as needed for nausea or for synergistic analgesic effect.

Reassess fractures and recheck pulses.

Antibiotics (recommended for all open combat wounds): If able to take PO: Moxifloxacin, 400 mg PO once a day. If unable to take PO (shock, unconsciousness): Cefotetan, 2 g IV (slow push over 3-5 minutes) or IM every 12 hours or Ertapenem, 1 g IV/IM once a day.

Pneumatic Antishock Garment (PASG): The PASG may be useful for stabilizing pelvic fractures and controlling pelvic and abdominal bleeding. Application and extended use must be carefully monitored. The PASG is contraindicated for casualties with thoracic or brain injuries.

Documentation of care: Document clinical assessments, treatments rendered, and changes in casualty's status on a TCCC Casualty Card. Forward this information with the casualty to the next level of care.

Acknowledgments

Many individuals contributed to this effort, in particular the SOF medical community and the individuals who serve on the CoTCCC. Special thanks to research administrator (RADM) Tom Richards.

RADM Bob Hufstader, RADM Steve Hart, CAPT Doug Freer, SFC Rob Miller, USA (Ret.), CAPT Brad Bennett, Dr. Howard Champion, SFC Dominique Greydanus, COL Steve Yevich, COL Dave Hammer, Mr. Dave Saren, Dr. Dale Uhler, Dr. Dave Callaway, Major Jeff Cain, Mr. Don Parsons, Dr. David Hoyt, Lt Col Mike Curriston, COL Rob Allen, COL Don Jenkins, LTC Kevin O'Connor, LTC Russ Kotwal, MAJ Chris Pappas, MSG Harold Montgomery, and HMCN Gary Welt.

References

- E.M. Acheson, B.S. Kheirabadi, E.J. Dick, and J.B. Holcomb, "Comparison of Hemorrhage Control Agents Applied to Lethal Extremity Arterial Hemorrhage in Swine," *Journal of Trauma*, 59: 865-74, 2005.
- N. Ahuja, T.A. Ostomei, P. Rhee, et al., "Testing of Modified Zeolite Hemostatic Dressings in a Large Animal Model of Lethal Groin Injury," *Journal of Trauma*, 61: 1312-20, 2006.
- H.B. Alam, D.B. Burris, J.A. DaCorta, and P. Rhee, "Hemorrhage Control in the Battlefield: Role of New Hemostatic Agents. *Military Medicine*, 170: 63-9, 2005.
- H.B. Alam, Z. Chen, A. Jaskilie, et al., "Application of a Zeolite Hemostatic Agent Achieves 100% Survival in a Lethal Model of Complex Groin Injury in Swine," *Journal of Trauma*, 56: 974-83, 2004.
- H.B. Alam, Z. Chen, G. Velmahos, et al., "Profound Hypothermia is Superior to Ultraprofound Hypothermia in Improving Survival in a Swine Model of Lethal Injuries," *Surgery*, 140: 307-14, 2006.
- H.B. Alam and P. Rhee, "New Developments in Fluid Resuscitation," *Surgical Clinic North America*, 87: 55-72, 2007.
- H.B. Alam, G.B. Uy, D. Miller, et al., "Comparative Analysis of Hemostatic Agents in a Swine Model of Lethal Groin Injury," *Journal of Trauma*, 54: 1077-82, 2003.
- R.H. Alexander and H.J. Proctor, *Advanced Trauma Life Support 1993 Student Manual*, American College of Surgeons, Chicago, 1993.
- R.C. Allen and J.M. McAtee, *Pararescue Medications and Procedures Manual*, Air Force Special Operations Command Publication, January 1999.
- Z. Arthurs, D. Cuadrado, Beekley, et al., "The Impact of Hypothermia on Trauma Care at the 31st Combat Support Hospital," *American Journal of Surgery*, 191:610-14, 2006.
- M.S. Baker, "Advanced Trauma Life Support: Is it Acceptable Stand-alone Training for Military Medicine?" *Military Medicine*, 159: 581-90, 1994.
- E.D. Barton, M. Epperson, and D.B. Hoyt, et al., "Prehospital Needle Aspiration and Tube Thoracostomy in Trauma Victims: A Six-year Experience with Aeromedical Crews," *Journal of Emergency Medicine*, 13: 155-63, 1995.

- C. Bateman, "Saving Lives Amid Bullets and Bombs," *South African Medical Journal*, 96:268-70, 2006.
- R.F. Bellamy, "How Shall We Train for Combat Casualty Care?" in *Military Medicine*, 152: 617-21, 1987.
- R. Ben-Abraham, I. Gur, Y. Vater, and A.A. Weinbroum, "Intraosseous Emergency Access by Physicians Wearing Full Protective Gear," *Academy of Emergency Medicine*, 10: 1407-10, 2003.
- W.H. Bickell, M.J. Wall, and P.E. Pepe, et al., "Immediate versus Delayed Fluid Resuscitation for Hypotensive Patients with Penetrating Torso Injuries," *New England Journal of Medicine*, 331: 1105-9, 1994.
- M. Bottoms, "Tactical Combat Casualty Care: Saving Lives on the Battlefield," *Tip of the Spear*, USSOCOM command publication, June 2006, pp. 34-5.
- M. Bowden, "BlackHawk Down," *Atlantic Monthly Press*, New York. p. 292, 1999.
- F.J. Brimms, "Primary Spontaneous Tension Pneumothorax in a Submariner at Sea," *Emergency Medical Journal*, 21: 394-5, 2004.
- S. Britten and S.H. Palmer, "Chest Wall Thickness May Limit Adequate Drainage of Tension Pneumothorax by Needle Thoracentesis," *Journal of Accident Emergency Medicine*, 13: 426-7, 1996.
- S. Britten, S.H. Palmer, and T.M. Snow, "Needle Thoracentesis in Tension Pneumothorax: Insufficient Cannula Length and Potential Failure," *Injury*, 27: 321-2, 1996.
- B.D. Brown, commander, "Combat Trauma Training in Special Operations Forces," USSOCOM letter of December 9, 2005a.
- B.D. Brown, commander, "Letter of Commendation to Army Medical Command," USSOCOM letter of August 17, 2005b.
- B.D. Brown, commander, "Special Operations Combat Medic Critical Task List," USSOCOM letter of March 9, 2005c.
- Bureau of Medicine and Surgery (Navy Surgeon General), "Tactical Combat Casualty Care Training," message of 111622Z December 2006.
- D. Burris, USUHS panel letter on the safety of QuikClot, February 26, 2003.
- D.G. Burris, J.B. FitzHarris, J.B. Holcomb, et al., *Emergency War Surgery Manual*, Third United States Revision, 2004.
- F. Butler, "Tactical Combat Casualty Care: Combining Good Medicine with Good Tactics," *Journal of Trauma*, 54 (Suppl): S2-3, 2003.
- F.K. Butler, "Tactical Medicine Training for SEAL Mission Commanders," *Military Medicine*, 166: 625-31, 2001.
- F.K. Butler, D. Greydanus, and J. Holcomb, "Combat Evaluation of TCCC Techniques and Equipment, 2005," *USAISR Report 2006-01*, November 2006.

- F.K. Butler and J. Hagmarm, eds., "Tactical Management of Urban Warfare Casualties in Special Operations," *Military Medicine*, 165(Suppl): 1-48, 2000.
- F.K. Butler, J. Hagmann, and E.G. Butler, "Tactical Combat Casualty Care in Special Operations," *Military Medicine*, 161(Suppl): 1-16, 1996.
- F.K. Butler and J.B. Holcomb, "The Tactical Combat Casualty Care Transition Initiative," *U.S. Army Medical Department Journal*, April-June 2005.
- F.K. Butler and D.J. Smith, "Tactical Management of Diving Casualties in Special Operations," in the 46th workshop of the Undersea and Hyperbaric Medical Society, Kensington, MD, Undersea and Hyperbaric Medical Society, 1996.
- K.L. Butler, I.M. Best, W.L. Weaver, and H.L. Bumpers, "Pulmonary Artery Injury and Cardiac Tamponade after Needle Decompression of a Suspected Tension Pneumothorax," *Journal of Trauma*, 54: 610-11, 2003.
- M.D. Calkins, G. Fitzgerald, T.B. Bentley, et al., "Intraosseous Infusion Devices: a Comparison for Potential Use in Special Operations," *Journal of Trauma*, 48: 1068-74, 2000.
- M.E. Carr, "Monitoring of Hemostasis in Combat Trauma Patients," *Military Medicine*, 169 (Suppl): 11-15, 2004.
- C.C. Clifford, "Treating Traumatic Bleeding in a Combat Setting," *Military Medicine*, 169: 8-10, 2004.
- C.C. Cloonan, "Treating Traumatic Bleeding in a Combat Setting," *Military Medicine*, 168: 8-10, 2004.
- D.C. Covey, "Combat Orthopedics: a View from the Trenches," *Journal of American Academy Orthopedic Surgery*, 14: S10-17, 2006.
- D.C. Cullinane, J.A. Morris, J.G. Bass, and E.J. Rutherford, "Needle Thoracostomy May Not Be Indicated in the Trauma Patient," *Injury*, 32: 749-52, 2001.
- D.P. Davis, K. Pettlt, C.D. Rom, et al., "The Safety and Efficacy of Prehospital Needle and Tube Thoracostomy by Aeromedical Personnel," *Prehospital Emergency Care*, 9: 191-7, 2005.
- R.A. DeLorenzo, "Medic for the Millennium: the U.S. Army 91W Health Care Specialist," *Military Medicine*, 166: 685-8, 2001.
- B. Donham and M. Otten, "Hypotensive Resuscitation," *Journal of Special Operations Medicine*, 6: 35-8, 2006.
- M.A. Dubick and J.B. Holcomb, "A Review of Intraosseous Vascular Access: Current Status and Military Application," *Military Medicine* 2000: 165: 552-9.
- B.J. Eastridge, D. Jenkins, S. Flaherty, H. Schiller, and J.B. Holcomb, "Trauma System Development in a Theater of War: Experiences from Operation Iraqi Freedom and Operation Enduring Freedom," *Journal of Trauma*, 1366-73, 2006.
- M. Eckstein and D. Suyehara, "Needle Thoracostomy in the Prehospital Setting," *Prehospital Emergency Care*, 2: 132-5, 1998.

- D. Fries, P. Innerhofer, and W. Schobersberger, "Coagulation Management in Trauma Patients," *Current Opinion Anesthesiology*, 15: 217-23, 2002.
- M.L. Givens, K. Ayotte, and C. Manifold, "Needle Thoracostomy: Implications of Computed Tomography Chest Wall Thickness," in *Academy of Emergency Medicine*, 11: 795-6, 2004.
- E.A. Gonzalez, F.A. Moore, and J.B. Holcomb, et al., "Fresh Frozen Plasma Should be Given Earlier to Patients Requiring Massive Transfusion," *Journal of Trauma*, 62: 112-19, 2007.
- J. Gresham, *The Year in Military and Veteran's Medicine, 2005-2006*, Department of Veterans Affairs, Washington, D.C.
- C.K. Grissom, L.K. Weaver, T.P. Clemmer, and A.H. Morris, "Theoretical Advantage of Oxygen Treatment for Combat Casualties during Medical Evacuation at High Altitude," *Journal of Trauma*, 61:461-7, 2006.
- F.X. Guyette, J.C. Rittenberger, T. Platt, et al., "Feasibility of Basic Emergency Medical Technicians to Perform Selected Advanced Life Support Interventions," *Prehospital Emergency Care*, 10:518-21, 2006.
- M.T. Handrigan, T.B. Bentley, J.D. Oliver, L.S. Tabaku, J.R. Burge, and J.L. Atkins, "Choice of Fluid Influences Outcome in Prolonged Hypotensive Resuscitation after Hemorrhage in Awake Rats," *Shock*, 23: 337-43, 2005.
- L.E. Heiskell and R.H. Carmona, "Tactical Emergency Medical Services: an Emerging Subspecialty in Emergency Medicine," *Annals Emergency Medicine*, 23: 778-85, 1994.
- K. Hell, "Characteristics of the Ideal Antibiotic for Prevention of Wound Sepsis Among Military Forces in the Field," *Rev Infectious Disease*, 13(Suppl): S164-9, 1991.
- K. Heng, A. Bystrycki, and M. Fitzgerald, et al., "Complications of Intercostal Catheter Insertion using EMST Techniques for Chest Trauma," *ANZ Journal of Surgery*, 74: 420-3, 2004.
- K.H. Henry, "Naval Operational Medical Lessons Learned After Action Report of August 24, 2005," CDR Item 739, Naval Operational Medicine Institute, Pensacola, FL.
- D. Henshaw, "Tension Pneumothoraces," *Lancet*, 365: 2243, 2005.
- J.B. Holcomb, "The 2004 Fitts Lecture: Current Perspectives on Combat Casualty Care," *Journal of Trauma*, 59: 990-1002, 2005a.
- J.B. Holcomb, "Use of Recombinant Activated Factor VII to Treat the Acquired Coagulopathy of Trauma," *Journal of Trauma*, 58: 1298-1303, 2005b.
- J.B. Holcomb, "Fluid Resuscitation in Modern Combat Casualty Care: Lessons Learned from Somalia," *Journal of Trauma*, 54: S46-51, 2003.
- J.B. Holcomb, J. Caruso, L. Pearse, et al., "Causes of Death in Special Operations Forces in the Global War on Terror," *Annals Surgery*, 245: 986-91, 2007a.
- J.B. Holcomb, D. Jenkins, P. Rhee, et al., "Damage Control Resuscitation: Directly Addressing the Early Coagulopathy of Trauma," *Journal of Trauma*, 62: 307-10, 2007b.
- J.B. Holcomb, L.G. Stansbury, H.R. Champion, C. Wade, and R.F. Bellamy, "Understanding Combat Casualty Care Statistics," *Journal of Trauma*, 60: 397-401, 2006.

J.H. Holcomb, S.T. Kerr, J.M. Macaitis, et al., "Needle vs Tube Thoracostomy in a Swine Model of Traumatic Tension Pneumothorax," *Journal of Trauma* (in press).

G.M. Hostage, "USSOCOM Visit to the Pararescue Medical Course at Kirtland AFB September 15-16, 2005," Air Force Education and Training Command letter, 8 September 2005.

D.W. Howes, A. Stratford, M. Stirling, C.C. Ferri, and T. Bardell, "Administration of Recombinant Factor VI: Ia Decreases Blood Loss after Blunt Trauma in Noncoagulopathic Pigs," *Journal of Trauma*, 62: 311-15, 2007.

H. Husum, T. Olsen, M. Murad, T. Wisborg, and M. Gilbert, "Preventing Post-injury Hypothermia During Prolonged Prehospital Evacuation," *Prehospital Disaster Medicine*, 17: 23-6, 2002.

D.L. Isbye and S.L. Nielson, "Intraosseous Access in Adults—an Alternative if Conventional Vascular Access is Difficult," *Ugeskr Laeger*, 168: 2793-7, 2006.

C. Jarvis, R. Kotwal, J. Erickson and M. Trawinski, "Lessons Learned in Operation Enduring Freedom and Operation Iraqi Freedom," Uniformed Services Academy of Family Physicians presentation, March 13, 2007.

D.L. Johnson, J. Findlay, A.J. Macnab and L. Susak, "Cadaver Testing to Validate Design Criteria of an Adult Intraosseous Infusion System," *Military Medicine*, 170: 251-7, 2005.

R. Jones and J. Hollingsworth, "Tension Pneumothoraces Not Responding to Needle Thoracentesis," *Emergency Medicine Journal*, 19: 176-7, 2002.

R. Kentner, P. Safar, and S. Prueckner, et al., "Titrated Hypertonic/Hyperoncotic Solution for Hypotensive Fluid Resuscitation during Uncontrolled Hemorrhagic Shock in Rats," *Resuscitation*, 65: 87-95, 2005.

B.S. Kheirabadi, E.M. Acheson, and R. Deguzman, et al., "The Potential Utility of Fibrin Sealant Dressing in Repair of Vascular Injury in Swine," *Journal of Trauma*, 62: 94-103, 2007.

B.S. Kheirabadi, E.M. Acheson, R. Deguzman, et al., "Hemostatic Efficacy of Two Advanced Dressings in an Aortic Hemorrhage Model in Swine," *Journal of Trauma*, 59: 25-34, 2005.

K.C. Kiley, "Operational Needs Statement for Medical Simulation Training Centers for Combat Lifesavers and Tactical Combat Casualty Care Training," Army Surgeon General letter DASG-ZA of September 1, 2005a.

K.C. Kiley, Army Surgeon General ALARACT 066-2005, March 30, 2005b.

K.C. Kiley, "HemCon Dressing (HC; chitosan bandage) for Deployed Army Personnel," Army Surgeon General letter of July 20, 2003c.

R.B. King, D. Filips, S. Blitz, and S. Logsetty, "Evaluation of Possible Tourniquet Systems for Use in the Canadian Forces," *Journal of Trauma*, 60: 1061-71, 2006.

R. Kotwal, K.C. O'Connor, T.R. Johnson, et al., "A Novel Pain Management Strategy for Combat Casualty Care," *Annals of Emergency Medicine*, 44: 121-7, 2004.

M.M. Krausz, "Resuscitation Strategies in the Israeli Army," a presentation to the Institute of Medicine Committee on Fluid Resuscitation for Combat Casualties, September 17, 1998.

- N. Kucisec-Tepes, D. Bejuk, and D. Kosuta, "Characteristics of War Wound Infection," *Acta Med Croatica*, 60: 353-63, 2006.
- D. Lakstein, Al Blumenfeld, and T. Sokolov, et al., "Tourniquets for Hemorrhage Control on the Battlefield: A 4-year Accumulated Experience," *Journal of Trauma*, 54: S221-5, 2003.
- B.G. LaRocco and H.E. Wang, "Intraosseous Infusion," *Prehospital Emergency Care*, 7: 280-5, 2003.
- S. Leigh-Smith and T. Harris, "Tension Pneumothorax—Time for a Re-think?" *Emergency Medicine Journal*, 22:8-16, 2005.
- R.L. Mabry, "Tourniquet Use on the Battlefield," *Military Medicine*, 171: 352-6, 2006.
- R.L. Mabry, J.B. Holcomb, and A.M. Baker, et al., "United States Army Rangers in Somalia: An Analysis of Combat Casualties on an Urban Battlefield," *Journal of Trauma*, 49: 515-29, 2000.
- R.G. Malish, "The Preparation of a Special Forces Company for Pilot Recovery," *Military Medicine*, 164: 881-4, 1999.
- J.E. Martin, R. Mehta, B. Aarabi, et al., "Intracranial Insertion of a Nasopharyngeal Airway in a Patient with Craniofacial Trauma," *Military Medicine*, 169: 496-7, 2004.
- U. Martinowitz, M. Zaarur, B.L. Yaron, A. Blumendeld, and G. Martinovits, "Treating Traumatic Bleeding in a Combat Setting: Possible Role of Recombinant Activated Factor W," *Military Medicine*, 169 (Suppl): S16-18, 2004.
- D. Massarutti, G. Trillo, G. Berlot, et al., "Simple Thoracostomy in Prehospital Trauma Management is Safe and Effective: A 2-year Experience by Helicopter Emergency Medical Crews," *European Journal of Emergency Medicine*, 13: 276-80, 2006.
- J.S. Maughon, "An Inquiry into the Nature of Wounds Resulting in Killed in Action in Vietnam," *Military Medicine*, 135: 8-13, 1970.
- M.T. Mazurek and J.R. Ficke, "The Scope of Wounds Encountered in Casualties from the Global War on Terrorism: from the Battlefield to the Tertiary Treatment Facility," *Journal American Academy Orthopedic Surgery*, 14: S18-23, 2006.
- M. McCarthy, "U.S. Military Revamps Combat Medic Training and Care," *Lancet*, 361: 494-5, 2003.
- I. McDevitt, *Tactical Medicine*. Paladin Press, Boulder, CO, 2001.
- J. McManus, T. Hurtado, A. Pusateri, and K.J. Knoop, "A Case Series Describing Thermal Injury Resulting from Zeolite Use for Hemorrhage Control in Combat Operations," *Prehospital Emergency Care*, 11: 67-71, 2007.
- J.J. McPherson, D.S. Feigin, and R.F. Bellamy, "Prevalence of Tension Pneumothorax in Fatally Wounded Combat Casualties," *Journal of Trauma*, 60: 573-8, 2006.
- W.H. McRaven, *Spec Ops: Case Studies in Special Operations Warfare Theory and Practice*, Presidio Press, Novato, CA, 1996.
- N.E. McSwain, S. Frame, and J.L. Paturas, eds., *Prehospital Trauma Life Support Manual*, Mosby, Akron, OH, 4th edition, 1999.

N.E. McSwain, S. Frame, and J.P. Salome, eds., *Prehospital Trauma Life Support Manual*, 5th edition (second printing), Mosby, Akron, OH, 2003.

N.E. McSwain and J.P. Salome, eds., *Prehospital Trauma Life Support Manual*, 6th edition, Mosby, Akron, OH, 2006.

S.G. Mellor, G.J. Cooper, and G.W. Bowyer, "Efficacy of Delayed Administration of Benzyl Penicillin in the Control of Infection of Penetrating Soft Tissue Injuries in War," *Journal of Trauma*, 40: S128-34, 1996.

D.D. Miller, G. Guimond, D.P. Hostler, T. Piatt, and H.E. Wang, "Feasibility of Sternal Intraosseous Access by Emergency Medical Technician Students," *Prehospital Emergency Care*, 9: 73-8, 2005.

J.J. Mucciarone, C.H. Llewellyn, and J. Wightman, "Tactical Combat Casualty Care in the Assault on Punta Patilla Airfield," *Military Medicine*, 171: 687-90, 2006.

C.K. Murray, S.A. Roop, and D.R. Hospenhal, et al., "Bacteriology of War Wounds at the Time of Injury," *Military Medicine*, 171: 826-9, 2006.

J. Navein, R. Coupland, and R. Dunn, "The Tourniquet Controversy," *Journal of Trauma*, 54: S219-20, 2003.

Navy Operational Medical Lesson Learned 8177, QuikClot Application Method.

Navy Operational Medical Lesson Learned 39582, Medical Training.

Navy Operational Medical Lesson Learned 40329, Training Marines.

Navy Operational Medical Lesson Learned 41655, Tension Pneumothorax.

S. Naylor, *Not a Good Day to Die*, Berkley Books, New York, NY, 2005.

M.C. Neuffer, J. McDivitt, and D. Rose, et al., "Hemostatic Dressings for the First Responder: a Review," *Military Medicine*, 169: 716-20, 2004.

K.O. O'Connor and F.K. Butler, "Antibiotics in Tactical Combat Casualty Care," *Military Medicine*, 168:911-14, 2003.

C.G. Pappas, "The Ranger Medic," *Military Medicine*, 166: 394-400, 2001.

R.Y. Peng and F.S. Bongard, "Hypothermia in Trauma Patients," *Journal American College Surgeons*, 188: 685-96, 1999.

A.E. Pusateri, A.V. Delgado, E.J. Dick, et al., "Application of a Granular Mineral-based Hemostatic Agent (QuikClot) to Reduce Blood Loss After Grade V Liver Injuries in Swine," *Journal of Trauma*, 57: 555-62, 2004.

A.E. Pusateri, J.B. Holcomb, B.S. Kheirabadi, et al., "Making Sense of the Preclinical Literature on Advanced Hemostatic Products," *Journal of Trauma*, 60: 674-82, 2006.

A.E. Pusateri, H.E. Modrow, R.A. Harris, et al., "Advanced Hemostatic Dressing Development Program: Animal Model Selection Criteria and Results of a Study of Nine Hemostatic Dressings in a Model of Severe Large Venous Hemorrhage and Hepatic Injury in Swine," *Journal of Trauma*, 53: 518-26, 2003.

P. Rhee, C. Brown, M. Martin, et al., "QuikClot Use in Trauma for Hemorrhage Control: Case Series of 103 Documented Uses," *Journal of Trauma* (in press).

T.R. Richards, commander, "Tactical Combat Casualty Care Training," Naval Special Warfare Command letter, 1500 Series 04/0341 of April 9, 1997.

V.L. Ruterbusch, M.J. Swiergosz, L.D. Montgomery, K.W. Hopper, and W.A. Gerth, "ONR/MARSYSCOM Evaluation of Self-applied Tourniquets for Combat Applications," *Navy Experimental Diving Unit Technical Report* TR 05-15, November 2005.

V.Y. Sohn, J.P. Miller, C.A. Koeller, et al., "From the Combat Medic to the Forward Surgical Team: The Madigan Model for Improving Trauma Readiness of Brigade Combat Teams Fighting the Global War on Terror," *Journal of Surgical Research*, 138: 25-31, 2007.

J.L. Sondeen, V.G. Coppes, and J.B. Holcomb, "Blood Pressure at Which Rebleeding Occurs After Resuscitation in Swine with Aortic Injury," *Journal of Trauma*, 54: S110-17, 2003a.

J.L. Sondeen, A.E. Pusateri, V.G. Coppes, C.E. Gaddy, and J.B. Holcomb, "Comparison of 10 Different Hemostatic Dressings in an Aortic Injury," *Journal of Trauma*, 54: 280-5, 2003b.

B.W. Starnes, A.C. Beekley, J.A. Sebesta, C.A. Anderson, and R.M. Rush RM, "Extremity Vascular Injuries on the Battlefield: Tips for Surgeons Deploying to War," *Journal of Trauma*, 60: 432-42, 2006.

M. Tarpey, "Tactical Combat Casualty Care in Operation Iraqi Freedom," *U.S. Army Medical Department Journal*, April-June 2005, pp. 38-41.

U.S. Central Command message 061715Z, "Program," January 2005.

U.S. Coast Guard message 221752Z, "Tactical Medical Response," November 2006.

U.S. Marine Corps Message 02004Z, "Tactical Combat Casualty Care (TCCC) and Combat Lifesaver (CLS) Fundamentals, Philosophies, and Guidance," August 2006.

U.S. Special Operations Command message 222016Z, "Tactical Combat Casualty Care Training and Equipment," Washington, D.C., Headquarters, U.S. Marine Corps, 2005.

A. Vardi, H. Berkenstadt, I. Levin, A. Bentencur, and A. Ziv, "Intraosseous Vascular Access in the Treatment of Chemical Warfare Casualties Assessed by Advanced Simulation: Proposed Alteration of Treatment Protocol," *Anesthesia & Analgesia*, 98: 1753-8, 2004.

E.D. Vinson, "Improvised Chest Tube Drain for Decompression of an Acute Tension Pneumothorax," *Military Medicine*, 169: 403-5, 2004.

T.J. Walters, D.S. Kauvar, D.G. Baer, and J.B. Holcomb, "Battlefield Tourniquets—Modern Combat Lifesavers," *U.S. Army Medical Department Journal*, April-June 2005a, pp. 42-3.

T.J. Walters and R.L. Mabry, "Issues Related to the Use of Tourniquets on the Battlefield," *Military Medicine*, 170: 770-775, 2005.

T.J. Walters, J.C. Wenke, D.J. Greydanus, D.S. Kauver, and D.G. Baer, "Laboratory Evaluation of Battlefield Tourniquets in Human Volunteers," *USAISR Report 2005-05*, September 2005b.

D.D. Watts, A. Trask, and K. Soeken, et al., "Hypothermic Coagulopathy in Trauma: Effect of Varying Levels of Hypothermia on Enzyme Speed, Platelet Function, and Fibrinolytic Activity," *Journal of Trauma*, 44: 846-54, 1998.

C. Waydness and S. Sauerland, "Pre-hospital Pleural Decompression and Chest Tube Placement after Blunt Trauma," *Resuscitation*, 72: 11-25, 2007.

I. Wedmore, J.G. McManus, A.E. Pusateri, and J.B. Holcomb, "A Special Report on the Chitosan-based Hemostatic Dressing: Experience in Current Combat Operations," *Journal of Trauma*, 60: 655-8, 2006.

I.S. Wedmore, T. Johnson, J. Czarnik, and V. Hendrix, "Pain Management in the Wilderness and Austere Environments," *Journal of Special Operations Medicine*, 6: 56-64, 2006.

D.R. Welling, D.G. Burris, J.E. Hutton, S.L. Minken and N.M. Rich, "A Balance Approach to Tourniquet Use: Lessons Learned and Relearned," *Journal of American College of Surgeons*, 203: 106-15, 2006.

B.C. West, R. Bentley, and R.J. Place, "In-flight Transfusion of Packed Red Blood Cells on a Combat Search and Rescue Mission: A Case Report from Operation Enduring Freedom," *Military Medicine*, 169: 181-3, 2004.

W. Winkenwerder, "ASDHA Policy Letter on Hypothermia Prevention and Treatment," February 16, 2006.

A.S. Wolberg, Z.H. Meng, D.M. Monroe III, and M. Hoffman, "A Systematic Evaluation of the Effect of Temperature on Coagulation Enzyme Activity and Platelet Function," *Journal of Trauma*, 56: 1221-8, 2004.

L.H. Wolff and T.F. Adkins, "Tourniquet Problems in War Injuries," *Bull U.S. Army Medical Department* 1945, pp. 77-85.

F.L. Wright, H.T. Hua, G. Velmahos, et al., "Intraoperative Use of the Hemostatic Agent QuikClot in a Coagulopathy Patient with Combined Thoracoabdominal Penetrating Trauma," *Journal of Trauma*, 56: 205-8, 2004.

J. Wright, J. Kalns, E.A. Wolf, et al., "Thermal Injury Resulting from Application of a Granular Mineral Hemostatic Agent," *Journal of Trauma*, 57: 224-30, 2004.

Guarantor: CAPT Frank K. Butler, Jr., MC USN (Ret.)

Contributors: CAPT Frank K. Butler, Jr., MC USN (Ret.); COL John B. Holcomb, MC USA; Stephen D. Giebner, MD MPH; Norman E. McSwain, MD FACS; James Bagian, MD

Chapter 3

Section II: The Kandahar Tourniquet

MAJ Glenn Phillips, Theater Observation Detachment Afghanistan

The Canadian Operational Mentoring Liaison Team (OMLT) Task Force 1-08 assigned to 1st Brigade, 205th Corps identified a significant medical equipment issue within its brigade when three Afghan soldiers bled to death because they did not have tourniquets. The Canadian OMLT medical team led by CPT Mike McBride investigated supplying coalition-style C-A-T tourniquets to the Afghan soldiers. This option was not feasible because of the high cost and complexity of the C-A-T tourniquets (estimated unit cost \$18).



Fig 3-2-1: C-A-T tourniquet

The Canadian OMLTs sprang into action, developed, and tested their own simple and effective “Kandahar Tourniquet.” The “Kandahar Tourniquet” is easy for the Afghan soldiers to use and very cost effective. The estimated unit cost is \$3, including the instruction sheet and packaging. The Canadians have placed an order for 4,000 units and plan to purchase enough “Kandahar Tourniquets” for all the Afghan soldiers in their area of operation.



Fig 3-2-2: “Kandahar Tourniquet”

The Canadian medical OMLTs are rightfully proud of their creative solution to life-threatening medical conditions, but they are not resting on their success. CPT McBride is investigating the addition of a steel or plastic rod to the tourniquet kit so that the Afghan soldiers will not have to use cleaning rods.

Following is a copy of the “Kandahar Tourniquet” OMLT press release:

Making a Difference in Afghanistan

CPT Mike McBride, HSS Mentor, Kandak 5-1, OMLT TF 1-08

Imagine a dismounted infantry company mentoring team moving through a village in the Zhari District of Afghanistan. Now imagine this team weighed down with weapons, ammunition, radios, night vision devices, and personal protective equipment. Now envision that every soldier is trained to deliver tactical combat casualty care and equipped with advanced wound dressings, hemostatic agents such as “Quikclot,” and tourniquets; who are even further complemented and supported by skilled medical technicians and physicians’ assistants; and who are “back stopped” by the most capable surgical facility the Canadian Military Medical Service has fielded in its 144 years. Now, imagine a soldier of a new army finding himself in the same operational environment, armed with little more than a brand new C-7 service rifle and the desire to make his country a safer place for his family.

Because of an incident in which three Afghan soldiers succumbed to their injuries when their platoon mates lacked the training and equipment to control life-threatening bleeding, the OMLT medical staff took action. A comprehensive plan was developed to advance the use of tourniquets within the 1st Brigade of the Afghanistan National Army’s 205 Corps in an effort to improve the survival rate of soldiers suffering serious injuries and massive hemorrhage.

A tourniquet is an easily applied, relatively uncomplicated piece of equipment that requires minimal training to use effectively. After a review of what was available to coalition forces in Kandahar and armed with technical advice received from both a materials technician and a parachute rigger, it was eventually decided to build a prototype of a simple design that could be replicated by local manufacturers using readily available materials.

The “Kandahar Tourniquet” is two loops sewn into a length of nylon webbing and a C-7 service rifle cleaning rod section to serve as the windlass. The manufacturing job, which involves some sewing and assembly tasks, has created employment opportunities that will improve the quality of lives of women in the Kandahar Province.

The next step was to accept the initial production run of 100 tourniquets and inject them into the refresher-training program as the next infantry Kandak in the training cycle ramps up for deployment. This step will be followed up by a full production run that will produce an additional 4,000 tourniquets—enough to issue one to every soldier, noncommissioned officer, and officer in the 1st Brigade as they participate in their operational refresher course.

Also included in the revised training program are incident scene management, establishing casualty collection points, casualty triage, and selecting and securing helicopter landing sites.

As this project comes to fruition, the OMLT will have done more to save the lives of Afghan soldiers on the battlefield than any one other item on the long list of items to be accomplished before the International Security Assistance Force mission is complete.

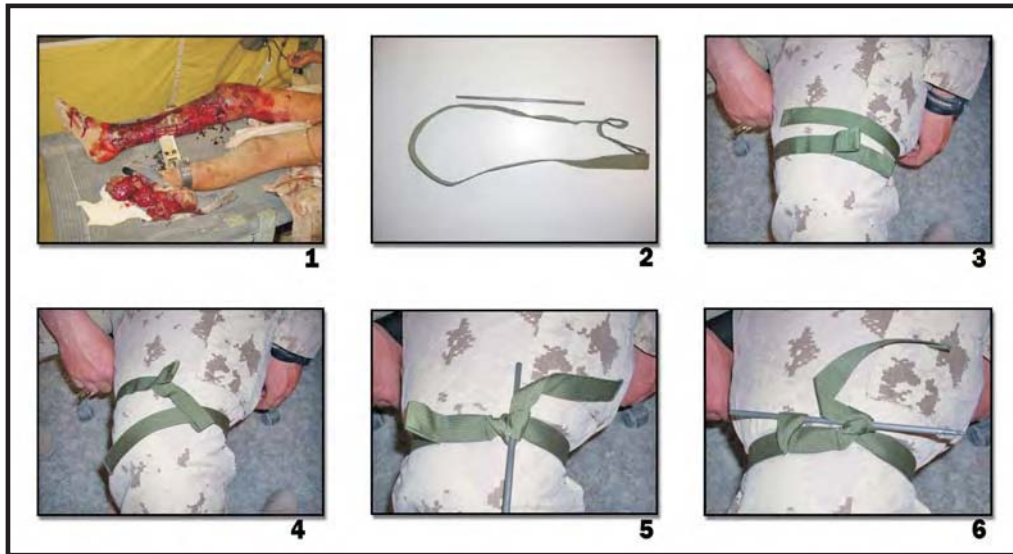


Fig 3-2-3: A brigade surgeon demonstrates the application of the “Kandahar Tourniquet”

Chapter 4

The Role of Medical Diplomacy in Stabilizing Afghanistan

Donald F. Thompson

Overview

Comprehensive stabilization and reconstruction of Afghanistan are impossible given the current fragmentation of responsibilities, narrow lines of authorities, and archaic funding mechanisms. Afghans are supportive of U.S. and international efforts, and there are occasional signs of progress, but the insurgent threat grows as U.S. military and civilian agencies and the international community struggle to bring stability to this volatile region. Integrated security, stabilization, and reconstruction activities must be implemented quickly and efficiently if failure is to be averted. More than a course correction is necessary to provide tangible benefits to the population, develop effective leadership capacity in the government, and invest wisely in reconstruction that leads to sustainable economic growth. A proactive, comprehensive reconstruction and stabilization plan for Afghanistan is crucial to counter the regional terrorist insurgency, much as the Marshall Plan was necessary to combat the communist threat from the Soviet Union.¹ This chapter examines the health sector as a microcosm of the larger problems facing the United States and its allies in efforts to stabilize Afghanistan.

A detailed RAND Corporation study cites the absence of an overarching, nationally driven plan, poor coordination, and the lack of a lead actor as major barriers to successful health sector reconstruction and stabilization.² Three obstacles identified in the RAND study are at the root of our failing efforts in Afghanistan: poor planning and coordination within and between U.S. government military and civilian agencies; lack of an overall health sector reconstruction game plan and the resources required for implementation; and misunderstanding of and failure to adjust for the complex counterinsurgency challenges of security, stabilization, and reconstruction. Focusing on health provides opportunities to overcome Taliban influence, strengthen the young Afghan government, and set the conditions for long-term economic growth. The lessons and principles from Afghanistan have broad regional and global application and should be adapted as part of our enduring national security strategy.

Medical interventions are an important component of a diplomatic strategy to regain moral authority for U.S. actions, regain the trust of moderate Muslims, and deny insurgents and religious extremists unencumbered access to safe harbors in ungoverned spaces. Such efforts in Afghanistan will be intensely interagency driven and must be tightly integrated and closely coordinated with offensive military operations, defensive security actions, and other reconstruction activities so that military actions are supported and resulting advantages are solidified. Our security architecture must integrate these medical activities into an appropriately time-phased campaign across the spectrum of conflict.

Nation building in Afghanistan will be more difficult and time-consuming than it was in post-World War II Europe. Afghanistan has a long history of tribal allegiances rather than nationalist loyalty, and it has endured an almost total destruction of its infrastructure, a process that began with the Soviet invasion almost 30 years ago. The threat to Afghanistan from diffuse insurgent networks is much more difficult to localize than was the threat of communism in Europe. Walling off insurgents is not possible in Afghanistan, where high value is placed on the free movement of people and goods across and within national boundaries. Furthermore, as our national strategy for stabilization and reconstruction is reappraised, senior leaders must carefully consider how to integrate all elements of national power effectively and create the appropriate

policy framework—coordinated interagency strategy, doctrine, authorities, and resources—in which each instrument may be applied.

Strategic Goals

An effective counterinsurgency campaign against the Taliban requires a combination of offensive, defensive, and stability operations, where stability operations include civil security, civil control, essential services, good governance, economic development, and infrastructure development. Essential services include water, electricity, health care, and education—all of which support economic growth and progress toward self-sufficiency. These services are unavailable to most Afghans, adding to discontent and societal tension and fueling the insurgency. Providing access to these services is the crucial counterinsurgency step that goes hand in hand with security. Strategic civil-military partnerships must be developed that create unity of effort where offensive military operations, defensive security operations, and the correct aspects of stabilization are applied across the spectrum from conflict to peace.

Increasing the effectiveness of Afghan government institutions and redressing popular grievances regarding essential services and corruption should shift the support of the population from the Taliban insurgency to the government of President Hamid Karzai. Improvements in the health sector are especially important. U.S. military forces are quite successful with conventional combat operations, but they struggle with engaging crucial civilian components of the government of Afghanistan. While more resources are necessary, they will be wasted if not applied more effectively.

Available Tools Unused

North Atlantic Treaty Organization (NATO) provincial reconstruction teams (PRTs), originally conceived as the model for reconstruction and stabilization in post-conflict settings, have been criticized for their concentration on short-term, unsustainable construction projects that crowd out local initiatives and fail to stem the rising violence in Afghanistan. NATO and the international community have been faulted for the lack of a well-crafted, publicly articulated, comprehensive master plan for reconstruction that applies lessons learned to enhance economic development. These problems stem from American inexperience with small counterinsurgency wars; the attempt to reap a peace dividend from the end of the Cold War by reducing defense budgets; and the focus on efficiency, technology, and specialization in many of our domestic and national security agencies. The Department of Defense (DOD) must now rapidly realign civil-military authorities and resources for counterinsurgency and stability operations.

Poor resource support and central coordination for local efforts are hampering the local and regional counterinsurgency impact of the PRT in the restive Kunar Province bordering Pakistan. As an example, the Taliban have maimed Afghans who work at the PRT compound, cutting off noses and ears to send a threatening message to others. When the PRT commander sought assistance for reconstructive surgery to counter the insurgents, a specialty hospital in Kabul operated by the CURE International nongovernmental organization (NGO) designed a plastic surgery training program that would train two Afghan surgeons a year while providing reconstructive surgery to 30 patients each year. The \$430,000 project cost of building sustainable capacity within the Afghan system was denied by the U.S. Central Command Humanitarian Assistance coordinator. Funding this initiative would have been a relatively inexpensive way to show U.S. support for local populations; boost local morale; and build needed, sustainable capacity in the Afghan health sector.

U.S. military forces are explicitly trained, equipped, and organized for short, decisive wars against massed enemy forces. However, they come up woefully short when the enemy instead seeks to discredit the development of a competent government and demoralize and terrorize civilians while using them for cover. Civilian U.S. government departments and agencies have shifted their focus from operational capacity to policy setting and are generally hampered by lack of specific congressional authorization to operate internationally and to obligate their funds outside their domestic domain. The complexity of the Federal Acquisition Regulations and the risk-averse nature of contracting officers often result in missed opportunities to act quickly in restoring essential services. Civilian personnel rules generally are not designed to support deployment of U.S. civil servants when it comes to matters of compensation, life insurance, medical evacuation, and long-term rehabilitation. Many capabilities within the military, civilian agencies, and NGOs have become so specialized as they seek increased efficiency that they have lost their ability to adapt and respond to a changing reconstruction and stabilization environment.

In one case, over 18 months of negotiation were required to assign two technical experts from the U.S. Public Health Service Commissioned Corps, part of the Department of Health and Human Services (DHHS), to the office of the Combined Security Transition Command-Afghanistan (CSTC-A) Command Surgeon to help with civil-military health sector development. These Commissioned Corps officers have outstanding expertise in maternal and childcare, developing basic health services across cultural barriers, communicable disease control, and food and drug safety. They work widely throughout U.S. Federal medicine in the Indian Health Services, Centers for Disease Control and Prevention, Food and Drug Administration, and other Federal departments and agencies. DOD ultimately was required to fund not only travel, deployment, and hazardous duty pay, but also baseline salary, benefits, retirement, medical evacuation, and even death benefits because DHHS is not funded for international stabilization and reconstruction work. Twenty Commissioned Corps officers volunteered for the two CSTC-A positions that were created; these experts could be more widely used if DHHS were resourced for these international developmental tasks.

Who Is Responsible for What?

Efforts to rehabilitate the health sector in Afghanistan suffer from many of the interagency coordination defects that have plagued the U.S. in its broader approach to post conflict stabilization efforts. The federal government is organized so that one department is in the lead in preconflict, conflict, or post-conflict settings, while the others assume secondary importance. In theory, at least, the Department of State (DOS) handles preconflict negotiations; DOD handles the conflict and rapidly exits when the conflict ends; and agencies other than DOD handle all the post-conflict work.

This scheme fails in a counterinsurgency because it does not provide for successful post-conflict reconstruction, nor does it account for dealing with non-state actors or insurgents. Insurgents blend in with and terrorize the population; undermine the government; and seek to perpetuate discontent, disorder, and instability. The key step in a counterinsurgency is to separate these insurgents from the support of the population. Mao Tse-tung described insurgents as fish swimming in the water of the population. Counterinsurgency is much more than simply attacking the fish, though sometimes this is the right approach. The goal is to separate the fish from the water by providing economic and political changes that undercut popular support for the insurgents. Insurgents have provided medical services to win over the rural population; Taliban-owned hospitals operate in Pakistan along the Afghanistan-Pakistan border and provide medical services to Afghans in the region. Focused health sector development within Afghanistan will draw the support of the population from the Taliban insurgents to the Afghan government.

Counterinsurgency stability operations may require offensive military actions at one time, while at another time security may be provided merely by the threat of military action, by covert military action, or by host-nation army or police forces. Essential services of clean water, emergency food, or basic health care may be provided by military personnel in a highly unstable setting or while active conflict is taking place but should be provided by NGOs, international organizations, or the host nation government as soon as conditions permit. Developing government capacity to provide health care services or confirming the quality of existing government services may initially be achieved by military-run PRTs but should quickly transition to U.S. civilian agencies assisting the host-nation governmental authorities. The common theme is that as the counterinsurgency operation evolves and stability and security increase, the host-nation government becomes stronger and takes over actions. Implementers of each specific task may change, but all offensive military operations, defensive security operations, and reconstruction and government capacity-building activities must be tightly integrated by all military and civilian participants across all phases of conflict.

Required unity of effort has not been achieved even within the U.S. military in Afghanistan today—one command structure controls offensive counter terrorist actions, and another one handles defensive security actions, security sector reform actions, and reconstruction actions. When the need for other sources of technical expertise from civilian agencies and other sources is considered, it is clear that the current organizational structure is inadequate.

New DOD policy elevates stability operations to a core competency akin to combat operations and states that while actions may best be performed by indigenous, foreign, or U.S. civilian personnel, U.S. military forces shall be prepared to perform all tasks necessary to maintain order when civilians cannot do so. The Government Accountability Office notes that DOD lacks interagency coordination mechanisms for planning and information sharing and has not identified the full range of capabilities needed for stability operations or the measures of effectiveness essential to evaluate progress. Performance measures must consider the crucial societal elements of civil security, civil control, essential services, governance, economic development, and infrastructure development and are doubly important when taking on a new mission—stabilization and reconstruction—in a new environment—post conflict—against a new enemy—an extremist insurgency.

Opportunities Lost, Lessons Not Learned

Nowhere is this disorganization more apparent nor have more opportunities been lost than in the areas of health and medical care in Afghanistan. Too much effort is wasted on poorly coordinated Medical Civic Action Programs (MEDCAPs), where U.S. and NATO International Security Assistance Force (ISAF) military medical personnel deliver health care directly to Afghan civilians, undercutting the confidence of the local population in their own government's ability to provide essential services.¹¹ While reasonable people may disagree about the effectiveness of MEDCAPs in nations where there is no functioning government to provide this health care, MEDCAPs in Afghanistan are largely inappropriate because they fail to contribute to long-term capacity-building. These teams are more appropriately used as tactical implementers of reconstruction projects in conjunction with PRTs, as described below.

Other activities have mixed results. Training of skilled birth attendants and midwives has turned out many graduates, but their poor distribution around the country has left many areas underserved, so the record-high maternal mortality rate remains extreme in most rural areas. Much effort is wasted when medical and educational infrastructure is built without assuring that trained Afghan personnel are available to operate and sustain the facility. Such criticism has been leveled at PRTs at the provincial and local level, at DOD in development of the Afghan National

Army (ANA) and Afghan National Police (ANP) health care systems, and at DHHS at the level of the Ministry of Public Health.¹²

U.S. civilian government efforts have not focused on comprehensive reconstruction of the civilian and military health sectors but rather have largely been limited to U.S. Agency for International Development (USAID) attempts to provide for NGO-delivered primary health care services under the Ministry of Public Health's basic package of health services. USAID, the European community, and the World Bank are the primary donors supporting development of the BPHS and have demonstrated considerable success in making this basic level of health care available to 82 percent of the population (defined as the percentage of the entire population within a two-hour walk of a village health post or better medical facility). Medical care is adequate, though minimal, for most Afghans. The rest of the health sector remains largely untouched.

Obstacles to Success

Resource restrictions reinforce and perpetuate poor performance and lost opportunities. Authorities for spending U.S. taxpayer funds are outdated, having been designed for small-scale humanitarian assistance in emergency settings where an effective government response is lacking. DOD Overseas Humanitarian, Disaster, and Casualty Assistance (OHDACA) funding is restricted to humanitarian emergency assistance that benefits only civilians and may not be used to build sustainable capacity. Bureaucratic obstacles to getting Afghan projects approved made OHDACA essentially a useless funding mechanism. Congress created the Commander's Emergency Response Program to provide some flexibility to local commanders for urgent humanitarian projects, but these funds are unavailable for developing substantive capacity in the civilian health care system. Other experts have recognized the deficiencies of such humanitarian assistance programs and are attempting to develop measures of effectiveness that will improve transparency, cost effectiveness, and interagency collaboration.

Security Sector Health Care: Independent or Integrated?

DOD has invested hundreds of millions of dollars in the ANA health care system yet is unable to apply funds where needed to make the system sustainable. Also in desperate need of rebuilding are the civilian institutions that provide direct support to the Afghan National Security Forces (ANSF), such as civilian medical and nursing schools, civilian allied health professional training institutes, emergency medical services systems, and clinical care for family members of the ANA and ANP.

In many nations, entitlement to use the superior military health care system is extended to political dignitaries and dependents of military personnel, leading to a multi-tiered system and discontent from the masses destined to use the underfunded, under-equipped, second-class civilian system. The United States is developing such a disparate system in Afghanistan by putting almost all of its health sector reconstruction resources into the security sector while ignoring the civilian sector. Current resource restrictions stall the development of a sustainable health care system with the correct central structure and relationship within and between ministries.

ANSF funds could be used to build an expensive military medical school for the ANA (despite a lack of professors to provide a quality medical education) but could not be legally used in the existing civilian medical university. Less than five percent of the amount required to build a military medical school could build tremendous capacity and quality in the civilian medical university to provide a sustainable source for all the physicians needed for the army and

improved quality within the civilian health care sector. Despite strong efforts to integrate health care services for the ANA and ANP into an efficient, cost-effective, sustainable ANSF system, cultural antipathies between the army and police are leading toward separate combat medic training for the two systems and redundant hospitals in Kabul, despite hundreds of empty hospital beds in the ANA hospital already renovated with U.S. dollars.

U.S. and ISAF military medical resources primarily deliver health care to Afghan security forces and Afghan civilians, not U.S. and coalition casualties. On any given day, 70 to 90 percent of patients hospitalized in coalition medical facilities are Afghans. Almost all Afghan casualty movement must be by U.S. and ISAF aircraft, since civilian ambulances are almost nonexistent. A heroic medical evacuation mission that attempted to save four Afghans critically burned in two separate mass casualty incidents demonstrated these dramatic inequities. A USAF C-17 aircraft with two three-member Critical Care Air Transport Teams was launched from Al Udeid Air Base in Qatar and landed in Kandahar to retrieve two Afghans who were being maintained on ventilators from ISAF facilities. From there it flew to Tarin Kowt in Uruzghan Province for two more Afghans on ventilators in the ISAF facility there, and then it went to Kabul to transfer the patients to the Afghan system, where ventilators are almost unknown. The patients were transferred from the most modern of Western medicine—flying intensive care units—to Afghan ambulances where each patient had to be manually ventilated. Three of the four patients died of their burns within 24 hours; the fourth was transferred to the U.S. facility at Bagram Air Base, where he died the next day. Some may question the valiant extent to which ISAF went in attempting to save these four civilians, but none will question how much greater the lifesaving impact would have been for many more Afghans if the costs of just the flight time for this 12-hour mission had been invested in building capacity within the Afghan civilian health care system. Not until such investment can be made will dependency on U.S. and ISAF resources be reduced.

ISAF remains minimally involved in ANSF health sector reform, despite positive movement in late 2006. NATO member nations could have a major impact on ANSF capacity development by contributing 5- to 10-member medical or surgical teams to work along existing U.S. DOD teams in the 400-bed National Military Hospital in Kabul and the four other 100-bed regional hospitals. All hospitals are within secure ANA garrisons, so national caveats concerning hostile exposure need not apply.

Not as Hard as It Seems

Detailed examination of health sector reconstruction in Afghanistan demonstrates the interconnectedness of governance and capacity building. Many well-intentioned infrastructure projects have been undertaken, including construction or renovation of hospitals, clinics, schools, and dormitories. Hundreds of millions of dollars have been spent on modern equipment and supplies to provide state-of-the-art medical and educational facilities. Highly publicized opening ceremonies are held where the facility or equipment is turned over, with much fanfare, to the appropriate ministry. Often, however, a visit to the facility several months later reveals that it is not operating as intended, creating the perception that the government has failed. This is frequently due to the lack of skilled manpower and the difficulty of providing culturally sensitive training that is understood and adopted by local workers. A more appropriate alternative would include the purchase of basic medical equipment from India or Pakistan while simultaneously developing training programs that provide education in literacy and basic sciences, in addition to the technical skills required for the particular position.

Didactic training is not as effective in Afghanistan as hands-on mentoring, so commitment to longer-term training engagement is essential.

After a female Afghan National Army Air Corps pilot bled to death during an emergency Caesarean section at a civilian women's hospital in Kabul, an obstetrics mobile training team did a comprehensive assessment of labor and delivery care. Findings included lack of rudimentary scientific knowledge and decision-making abilities concerning the use of basic medical equipment, such as blood pressure and heart rate monitors. A U.S. Army respiratory therapist brought advanced adult and neonatal ventilators, yet Afghan physicians preferred a two-hour, hands-on workshop in using oxygen masks and hoods rather than learning to use the advanced ventilators. Basic decision-making needs to include learning to distinguish between low-risk and high-risk patients and how to manage life-threatening emergencies.

Despite these glaring limitations, most contributions to the health sector consist of expensive medical equipment that is quickly broken because of inconsistent power supplies, runs out of reagents and becomes useless, or is never set up at all. The biomedical equipment technician on the obstetrics mobile training team quickly became the most sought after person in town, and he repaired patient monitors, sterilizers, infant incubators, surgical lights, suction machines, defibrillators, fetal heart rate monitors, infusion pumps, and laboratory equipment at multiple military and civilian hospitals around Kabul, while training Afghans twice his age to troubleshoot and repair such equipment after he left. Such mismatches between technology and maintenance capacity can be prevented by a proactive training effort in biomedical equipment repair. A collaborative training institute between the Kabul Medical University, the Ministry of Public Health, and the Ministry of Defense could train biomedical equipment technicians and many other allied health workers, such as radiology and ultrasound technicians and respiratory therapists. Graduates from this institute could work in government, military, or private hospitals and could be the foundation for economic development in the private sector.

Infrastructure development in conflict-prone settings often must include forgoing some efficiency in order to promote indigenous job creation and employment of host-nation contractors. For example, more local workers will need to be hired and trained for particular tasks in the initial years, leading some to question effectiveness of training programs. In fact, this practice broadens the opportunities for economic development to more Afghans and builds broad-based community support for the project. Development of host-nation capacity to drive the strategic and planning processes takes much time and patience but is essential in the long run. Afghans are best able to recommend what will and will not work and must be involved in every aspect of planning and implementing such development.

Achieving Success

The health sector has significant manpower, training, economic, referral, and geographic distribution factors that require a holistic systems approach. Afghanistan lacked a strong health care delivery system before the Soviet invasion, and subsequent fighting devastated what did exist. Women are highly represented in the health sector in much of the world; their cultural exclusion from much of Afghan society makes effective reconstruction more difficult. The long history of ethnic and tribal conflict between Pashtuns, Tajiks, Uzbeks, and Hazaras, with recent decades marked by changing associations of militias, warlords, and *mujahedeen*, complicates any effort that requires working cooperatively. Even with the Taliban extremists largely removed, working with others is anathema; consolidation of control is the standard.

Sustainable development of the health sector requires work against these ingrained cultural tendencies, but it must be done on Afghan terms and timelines, not those from the West. Engagement provides many opportunities to improve governance, reduce corruption, and validate the government's ability to provide for the people. All projects must be done in concert with Afghan priorities, which require building enduring personal and professional relationships,

making every attempt to understand cultural issues, and adjusting timelines accordingly. As reconstruction of the ANA medical system was under way, a senior Afghan official said, “Don’t look at us in a U.S. DOD-sized mirror. We’re very young compared to you.” The Afghan leadership recognizes that it is very new at developing a national army and national pride, and while they desire to move forward, it will take time, commitment, and much hard work. Another official said, “It took you over two hundred years to get where you are. Don’t expect us to change overnight.”

Every aspect of every project must emphasize collaboration. Ministries must work together at the central level, internal components within each ministry must work efficiently, and each central ministry must work well with its regional and provincial components. Create entry-level positions wherever possible, especially for women and incorporate basic education and literacy training. Projects must include work at the provincial and district levels so jobs can be created at these levels rather than only in the capital, Kabul. Health-related education and economic opportunities offer acceptable alternatives to poppy cultivation and armed resistance. Facilitating sustainable development of capacity in good, effective governance is the center of gravity for all stability operations in Afghanistan.

A recent burn-prevention education initiative funded by a private donor emphasizes these key governance issues. The initiative develops capacity in the Ministries of Public Health, Women’s Affairs, and Education, both centrally and at the provincial levels. The Ministry of Public Health lacks capacity to manage private-sector funding, so the project is managed by SOZO International, an NGO that specializes in community development. Early phases of the four-year project developed training programs in schools, hospitals, and community social centers in Kabul, Jalalabad, and Herat. This program is particularly important because it strengthens the central government’s ties to provincial and rural areas. It has no infrastructure costs and minimal supply costs. If funding were available, the program could be expanded across the entire country and could develop needed burn treatment capacity. Current U.S. government funding is unavailable for such valuable projects.

Measuring Success

Each area of development—curative care, public health, health education and training, and disaster preparedness and response—must be broken down into its component parts—infrastructure, equipment, supplies, manpower, training, policy and strategy, and objective proficiency—and measures of effectiveness must be developed for each component. A plan for sustainability of each component that considers the current and near-future state of the economy and society in Afghanistan must then be developed. CSTC-A developed such a planning process within the ANA that considered initial army health sector reconstruction efforts; this tool served as both a planning tool for DOD and a mentoring tool for ANA leaders.

Tactical development of the ANSF health care system included a biweekly focus on staffing, training, and infrastructure that included the development of army medics, police medics, medical logistics, evacuation capacity, preventive medicine, and planning for operations. Strategic development added strategy and policy development, medical facilities, clinical operations, health care administration, and civilian access. Measures of effectiveness were basic and limited to percentages of required staff that were in place and trained, buildings constructed or renovated, and equipment purchased. More meaningful metrics would include access to care, quality of care, availability of necessary supplies, diagnostic and laboratory tests and medications, and efficiency of care delivered, but these are far in the future. Both the progress toward existing milestones and the reconstruction and development processes themselves were evaluated carefully every two weeks, leading to both minor and major changes in tasks and

priorities. This assessment process was adopted by other CSTC-A sections working with the ANA. Such processes are a foundation that should be adopted for use with integrated civilian sector reconstruction in health and in other sectors of the economy.

An inexpensive effort with great dividends in multi-ministry capacity building was the first-ever Emergency Planning Workshop held in Kabul in December 2006. The Ministry of Public Health and ISAF co-sponsored the workshop, which was held in the ANA hospital auditorium. Participants included the ANA, ANP, the private Kabul Ambulance Association, the International Red Crescent Society, an Afghan senator, and several NGO hospitals. ISAF brought a Royal Air Force technical expert from Great Britain as the keynote speaker. The most valuable aspect of the conference was capacity building within the Ministries of Public Health and Defense during the six-week planning effort leading up to the workshop. A subsequent workshop held in January 2008 built on the earlier momentum.

Recommendations

The solution to successful stability operations in Afghanistan rests in unity of command and access to resources sufficient to make a difference. An operational-level health sector reconstruction office is needed in Kabul. Primarily personnel from DOD and USAID should staff it, with additional technical experts from DHHS, the U.S. Department of Agriculture (USDA), ISAF, academia, and NGOs. This office should develop health sector projects; set priorities; and integrate and unify nationwide planning and implementation with the government of Afghanistan, representatives of other nations, and international organizations and NGOs. This office must have coordinating authority with all health sector activities in the country including U.S. DOD efforts with the ANA, ANP, and ISAF.

The PRT is the tactical foundation. More teams are needed with more expertise; more integration of efforts within each team; much more access to and flexibility with resources; and more centralized control, coordination, and direction for health-sector work. PRTs must operate against broad but clearly defined goals and objectives and not freelance. Any MEDCAPS or village medical outreach activities should be coordinated by these teams.

A reach-back support office is needed to provide additional technical expertise and administrative, planning, financial, and contract support and to manage interagency coordination in Washington, D.C. It should include strong links to DOD, USAID, DHHS, USDA, and DOS, with full-time personnel assigned from each of these agencies. Development of emergency medical and disaster management systems, maternal and child care, and public health systems requires access to specialized expertise that often exists only outside government, so resources must support crucial academic and private sector partnerships. As a first step toward this function, a technical and planning reach-back support office was created early in 2007 at the Center for Disaster and Humanitarian Assistance Medicine at the Uniformed Services University of the Health Sciences, the DOD medical school in Bethesda, MD. This office has created a comprehensive health-sector improvement and integration plan for the ANSF and its staff is demonstrating its usefulness in other DOD stability operations by providing technical expertise and support to efforts outside of Afghanistan.

The overall responsibility for these stability operations must be vested in one government department or agency. That organization must be able to plan and implement projects, have sufficient technical expertise, be integrated into military operations, and be able to operate in an unstable and insecure environment. It must have a reliable resource stream that is available for capacity-building; administrative and program support; and timely access to academic, private sector, and NGO expertise. Funding must be sufficiently flexible to remove the current barriers

between Afghan civilian and security-sector work. Stabilization and reconstruction plans must evolve with the dynamic conditions on the ground.

Given the current security challenges in Afghanistan, Congress should initially assign the overall responsibility and funding for these efforts to DOD, which already has the responsibility and resources for developing an effective ANSF. New authorities must allow use of Afghan Security Forces funds in the civilian sector where necessary to build a sustainable ANSF system. USAID and other donors must provide additional civilian reconstruction funds to fully develop the civilian sector in conjunction with existing efforts. Sources should include humanitarian assistance and counternarcotics funds so that preventive programs and alternative livelihoods can be fully developed. As development progresses and Afghanistan is stabilized, the lead government agency for health-sector reconstruction should be reevaluated to determine if DOD should retain this responsibility for the long term.

Funding should be restricted to develop one integrated ANSF health-care delivery system, not separate systems for the ANA and ANP. Rather than creating an elite system for security forces and the privileged classes, a supporting capacity must be developed in the civilian sector for medical education and training, disaster preparation and emergency response, and family member care.

The initial focus should be on health-sector reconstruction that directly supports counterinsurgency efforts, such as medical infrastructure and training institutes that offer entry-level education (literacy, basic scientific, and vocational skills) and economic opportunities at the provincial and district levels. These training and economic opportunities must specifically empower women, both to reverse the regressive effects of the Taliban's exclusion of women from society and to return health-sector staffing to its pre-Taliban gender balance, where women were active participants. More economic opportunities for women build individual and community resilience and permit rural families to survive without the need to please the Taliban insurgents. Specific local requirements should be generated by tactical-level PRTs, perhaps using MEDCAP-like activities. Implementation of local activities should be managed by these PRTs, with adjustments and modifications according to local conditions. As a governance and anti-corruption tool, projects should begin in provinces and districts where local government authorities demonstrate their commitment by providing security and reducing poppy cultivation. Unskilled workers who are currently engaged in poppy cultivation can be offered jobs in building construction, a culturally acceptable alternative livelihood. This type of reconstruction will begin to address the pervasive poverty that debilitates the government and facilitates the recruitment of unemployed youths into militias, drug-related activities, and the insurgency.¹⁷ Projects along the Pakistan border will facilitate essential political reform and economic development at the local level.

Follow-on health-sector efforts should focus on rapidly strengthening the institutions required for long-term stability, including health care for uniformed ANP in rural areas and on the borders, development of combat casualty care and evacuation for ANA and ANP in an integrated emergency medical and trauma management system in the civilian sector, and health care for army and police family members in an upgraded civilian health sector. This step will improve recruitment and retention of quality personnel into the ANA and ANP and develop professional security institutions. All aspects of health education and training and the supporting institutions of logistics, communication, and transportation must be developed to enable the maturation of the ANSF, benefit civilian sector growth, and provide additional economic opportunities.

Multi-sector components include better integration of counternarcotics efforts, taking on preventive education by social marketing, rehabilitation of users, and more comprehensive

consideration of alternatives to poppy cultivation. Development of the private sector is possible in health-related areas, such as biomedical equipment repair and maintenance and fee-for-service health care. Opportunities will grow when a small degree of stability and security allows private sector investment to take root. Action now to provide a foundation of essential health care services will be the catalyst for these and other reconstruction efforts.

Conclusion

In unstable, conflict-sensitive environments, the condition of infrastructure is often a barometer of whether a society will slip further into violence or make a peaceful transition out of the conflict cycle. Infrastructure adds “arms and legs” to strategies aimed at winning “hearts and minds.” However, DOD should not take on infrastructure development alone. DOD lacks the long-term commitment, long-term developmental mindset, in-depth cultural awareness, economic expertise, and relationships with international organizations necessary for long-term strategic partnerships and transition as security and stability are achieved. The foundational organizational elements for stability operations in Afghanistan are in place, but major adjustments must be made rapidly to integrate civilian and military components into effective counterinsurgency tools so that long-term advances in reconstruction and economic growth may begin. Resource requirements are but a fraction of money spent to maintain military forces today. Our enemies in the region have waged a war that has compelled us to rethink our assumptions. We must now reconfigure our forces and the tools with which they work, reinvigorate our alliances within and outside government, and recommit ourselves to effective action.

Endnotes

1. Greg Behrman, *The Most Noble Adventure*, Free Press, New York, NY, 2007, p. 20.
2. Seth Jones, et al., *Securing Health: Lessons from Nation-Building Missions*, RAND Corporation, Santa Monica, CA, 2006, pp. 281–289.
3. Field Manual 3–24, *Counterinsurgency*, Headquarters Department of the Army, Washington, D.C., December 2006, pp. 1–19.
4. DOD Directive 3000.05, “Military Support for Stability, Security, Transition, and Reconstruction Operations,” November 28, 2005, defines stability operations as “military and civilian activities conducted across the spectrum from peace to conflict to establish or maintain order in States and regions.”
5. Michael McNerney, “Stabilization and Reconstruction in Afghanistan: Are PRTs a Model or a Muddle?” *Parameters*, Winter 2005/2006, pp. 32–33.

Chapter 5

Special Operations Medical Association 2007

Section I: Command Surgeon Update United States Special Operations Command Surgeon's Brief for the Special Operations Medical Association's 20th Annual Conference

COL Warner D. Farr

COL Farr presented an update and information briefing on pertinent special operations medical topics and addressed questions to Special Operations Medical Association (SOMA) conference attendees. He addressed the following special operations truths: Humans are more important than hardware; quality is better than quantity; special operations forces (SOF) cannot be mass-produced; and competent SOF cannot be created after emergencies occur. United States Special Operations Command's (USSOCOM) mission is to provide fully capable SOF to defend the United States and its interests and plan and synchronize operations against insurgent networks.

The USSOCOM command surgeon's office plans and synchronizes medical support for global operations against insurgent networks; provides support to and oversight for the medical joint doctrine, organization, training, and equipping of special operations medical and non-medical forces; and assists in deploying healthy, combat ready SOF to combatant commanders.

COL Farr gave an update on Tactical Combat Casualty Care (TCCC) training. TCCC was established to ensure a basic level of training and standardization of medical equipment to all combatants to reduce the mortality of injuries sustained on the battlefield. Both medics and non-medics are trained at their home stations on current equipment. Training normally occurs prior to deploying to a combat zone. There is a potential for medics to become casualties, and non-medical personnel intervention can result in potentially preventable battlefield deaths. TCCC concepts and equipment are saving lives on the battlefield and are endorsed by American College of Surgeons Committee on Trauma. Some of the feedback from TCCC indicate that there were 12 potentially survivable wounds in the Global War on Terrorism (GWOT). Some of the factors that might have changed the outcome were surgical airway versus intubation, hemostatic dressings versus direct pressure, tourniquets, needle thoracostomy, packed red blood cells on helicopters, battlefield antibiotics, and faster casualty evacuation (CASEVAC) time.

COL Farr also discussed the Command Medic Certification Program (CMCP). This program was developed by a requirements board that identifies training objectives. A curriculum evaluation board (CEB) writes external exams. The exams are given at both the Joint Special Operations Medical Training Center (JSOMTC) and Kirtland Air Force Base (AFB). The initial certification card is issued by the surgeon's office. Continuing medical education requirements exist and are based on the *Journal of Special Operations Medicine* (JSOM). Special Operations Combat Medic Skills Sustainment Course (SOCMSSC) and Joint Special Operations Medical Training Course training is monitored and provides an avenue of feedback necessary to insure both training and equipment are meeting the needs of the special operations medics. Recertification cards are issued by the surgeon's office, and the system is reviewed by schools' accrediting bodies.

CMCP advanced tactical practitioner's (ATP) mission is to certify special operations Level I ground combat medics within USSOCOM to perform command developed critical tasks to the interoperable special operations medic standard. There are eight special operations combat

medic classes per year and five pararescuemen (PJ) courses per year. USSOCOM 350-29 states that a medic must have an ATP card to deploy with a USSOCOM unit as a medic and must attend SOCMSSC. The surgeon's office maintains a database of all personnel who have tested the ATP from the first SOCM class of 2006 and PJ course of 2007 plus previously maintained special operations paramedic applications. JSOMTC have tested 601 personnel with 76 failures and 64 retested failures. Kirtland AFB has tested 102 with 23 failures and no retests. The future of ATP may include web-based or online ATP exams, video ATP questions, the development of a larger bank of questions, and the possibility of eligibility for National Registry of Emergency Medical Technicians–Paramedic.

COL Farr also discussed the JSOM, which provides updates from components, theater special operations commands (TSOCs), and U.S. Army Special Forces Command–Airborne surgeons. It also provides continuing medical education for physicians, PAs, nurses, and medics. The journals are available online. This initiative is not done by anyone else.

Antivenins in all areas of responsibility are not readily available or have not been Federal Drug Administration (FDA)-approved. Host nations may have developed antivenins for particular animals, but Department of Defense prevents its usage. USSOCOM is working to create and approve a policy that allows SOF to use local, non-FDA approved antivenins. To achieve this goal, USSOCOM will collect information from the combatant commands and provide the information to the Office of the Secretary of Defense (Humanitarian Assistance)/FDA. Due to nature and locations in which SOF operate, USSOCOM will also ask for exception to policy to allow use of investigational new drug antivenins below Level III medical facilities.

Commander USSOCOM authority for acquisition is governed under 10 USC Section 167. It allows for development and acquisition of special operations peculiar equipment, supplies, and services. USSOCOM also serves as the head agency for acquisition authority and contracting activity. We are currently looking at an autonomous expeditionary support platform, critical care module, and x-ray module. We currently partner with United States Army Medical Materiel Agency, Special Operations Forces Support Activity, and other organizations in medical acquisition productions and deployment. This includes the special operations TCCC acquisition. Increment one is designed for the unit level TCCC kits and increment two deals with CASEVAC and medical officer kits. We also are looking at a special operations variant for the RG-33 mine resistant ambush protected vehicle that changes the configuration of the vehicle to support two litters utilizing a collapsible end litter. We are the theater lead agent for medical material support of SOF at all areas of responsibility concerning unconventional warfare (UW) medical logistics.

COL Farr also addressed the initiative to develop a common special operations medical skills identifier. The lack of a unique medical skill identifier makes it difficult to maintain inventory of service medical personnel with unique special operations experience. USSOCOM will staff a package to each of the services and joint staff for coordination and approval.

TSOCs experience unacceptable risks in health-service support. This is due to the lack of medical staff knowledgeable in special operations. This deficiency strongly limits the TSOC's ability to plan, coordinate, and synchronize special operations support in executing the ten core special operations functions. TSOC medical structure was designed for peace time, pre-9/11 operations and is wholly inappropriate for continuous operations in multiple regions to prosecute the GWOT.

Currently Level II medical support in SOF is nonexistent in the Army, Navy, and Marines. The Air Force currently has Level II with possibilities to increase the number of teams available. The USSOCOM chief of staff has directed all components to identify Level II requirements.

Components with TSOC input must provide requirements to USSOCOM who will validate the requirements and work solutions where required. Components should then take these validated requirements to their respective components and work through their requirements and resourcing processes. This supports the validation process for preparation for overseas movement requirements.

Section II: Unconventional Warfare

UW Missions—Are You Doing it Right? Unconventional Medicine in Today's Fight

SFC Davila

This section is based on experiences encountered in today's battlefield. Do you know that environment? People have called it an insurgency, counterinsurgency, and irregular warfare. We called it home; we called it what it was.

Although I am a senior special forces medical sergeant (18D) who came from a team with strong foreign internal defense (FID) and advanced skills known only to special forces, everything done during our deployment was basic unconventional warfare (UW) tasks, many learned from Robin Sage. We went back to the basics.

On arrival, the medical capabilities of the team consisted of two 18Ds, one health care specialist 68W warrant officer 1, civil affairs (CA), and two 68Ws. All had their assigned missions, but I helped steer them in a direction that aided in the overall goal and did not hinder their mission.

We inherited a small clinic that included adequate supplies and treated about five civilians a day. Along with that clinic came a very knowledgeable indigenous doctor who was outstanding at family practice but terrible at trauma and a female nurse who had been trained by previous teams and the doctor; she was good. The nurse's husband, who knew nothing about medicine other than where they were located and (because of repetition) how much medicine to give, became the pharmacist. He was a cleanup man who was learning medicine, and he was very handy. None of these workers were used to his/her full potential.

Once I knew whom and what I had to work with, I spoke with the clinic workers and listened to their concerns and the concerns that we had addressed at the elders meeting. I wanted to know what the problems were. Was it fear? If so, fear of who or what and why. Was it food? If yes, then was it because of lack of production or procurement? Was it medical? What was their chief complaint? What are the basic necessities? I asked these questions before I ever told them what I would offer them, because if you say it, you must back it up. Actions are louder than words.

Now I just needed to find how I could get the biggest bang for my buck. Always start low and then offer more later. Never give too much up front; always escalate your capabilities. One hundred immunized children or livestock are cheaper, faster, and will gain more rapport. immunizations are very cheap, easy, and can be done monthly without much support.

Make a sensible plan and include your staff if you have one, or use the input from locals if possible. Determine where your clinic will be, inside or outside your perimeter. Tactics will play a role in this decision. Our clinic was within our base perimeter but outside the operation detachment-alpha's internal perimeter. Avoid overwhelming yourself; this includes your capabilities and your available materials. Use or train locals if possible. This will help with cultural differences and ensure you work yourself out of a job. Respect traditions as much as possible; figure out who will treat whom. Males and females need to be segregated. Be aware of feuds. Ensure everything is explained to families, and separate persons with injuries that may have been the result of family fights. Train your staff on how to talk to the people and gain information useful to you. This will ensure situational awareness in a fast changing UW environment.

Think about everyone, not just the local area. How will a decision affect the team adjacent to you, and can or will they tie in? They may not want to tie in, or they may not be able to, but include them somehow without tarnishing their image.

Take inventory of what you have and what you will need. Where will your medicines come from—the local town, the surrounding area, or a different province? Why not buy from all three? If there are multiple agencies working in your area buying medicines, go elsewhere and share the wealth. If you do decide to buy outside your area, do a little research and ensure you are not funding an improvised explosive device factory. Always tell the people where those medicines are going and where and how they will be used. This tactic will ensure word of your clinic will be spread. Who will pick up your purchased medicines, a trusted local or your team? This again will be a tactical decision. In some ways, it may be better to have a trusted local buy for you. The vendor may ship medicines to you, or your trusted local may have a truck and pick it up himself.

Present your medical plan to your commanders. You are not alone; let people know what you are doing, your higher may want to know why you are spending excessive money on medicines or may want to rotate people for training. Locals may be diverted to you if you are doing well or they may help find nongovernmental organization (NGO) support for you. Although we did not rely on medical evacuation (MEDEVAC) as our primary mover, higher had a good understanding of our goals and we had no problems with MEDEVAC support once they were aware of what we were doing. Although we did get quite a few MEDEVACs, none took priority over U.S. or coalition soldiers.

One of my goals was to win the hearts and minds of locals. Always try to influence the next generation so that they realize that the stories of the ugly American are not true. Although we did not conduct presence patrols, we stopped into town when possible. Influenced your militia and partner nation military. We would tell our guard force that they and the military had priority at the clinic so they knew when they were sick or injured we would be there for them. We treated an Afghan National Army (ANA) soldier with gunshot wound to buttock from point of injury to recovery. There was no need to evacuate him, we did the surgical debridement there in our clinic and rehabilitated him. Why evacuate him and have someone do what we were capable of doing ourselves, this showed the ANA that their chances of survival were good and that they would receive prompt medical care.

Another goal was to make us look like helpers and not dominators. We participated in Medreds with CA and vaccinated numerous people. We always tried to make ourselves look like we cared and were there to make a better environment and provide a better quality of life for them.

Another goal was to make locals come to us; there are too many chances for contact when you have to go to them, especially if you advertise. I asked CA not to build any clinics; I did not want any competition yet. CA closed a clinic that did not meet standards set by the elders. CA always offered better alternatives; we provided safe passage and validated taxi fares in emergencies. We followed through on our patients and provided good nursing care. Genuine care equals more business. This is why we had a woman driven 24 hours for treatment and a man walked two days to see us.

Be professional in appearance. We saw a big increase in patients when we wore scrubs and white coats. We also made upgrades to the clinic; these upgrades included plywood walls, painted white, tile floors, an area just for women, a pediatric area, a dental area, and an area for long-term patient care. Always remember you are doing this for them, but most importantly, tell them.

Learn to get along with others; sometimes others can be a pain and at times get in the way, but you cannot do it all yourself. I believe in the abilities of CA and have seen the use of CA turn a population. CA can and will turn the population with or against, but they will turn them, so help them, guide them, or join in their plan. CA can help tie you in to the NGO pipeline and aid in cases that require Level II treatment or better. This aid is very beneficial, NGOs may also find somewhere for patients to receive nursing or follow-up care.

If available, psychological operations (PSYOP) can help spread the word with radio, newspaper, stickers, and shuras or elders meetings. Word of mouth is the most powerful form of advertisement and what you should seek.

Always sell yourself. PSYOP can help and CA can spread the word about your clinic. Always tell people your hours of operation, capabilities, and qualifications. Advertise new equipment or services available. We were fortunate to have access to a small radio station that went out 20 kilometers, but we had to routinely drive 12 hrs to get to the clinic. CA and PSYOP are two ingredients needed to run a successful UW clinic.

Continue to expand your capabilities by offering more than just typical trauma treatments. Do not forget dental, veterinary, and preventive medicine (PM).

No one likes being without teeth; if you start dentistry be prepared to continue to do more. I ended up training a local to take care of these cases.

We were lucky. We did not have much livestock in our area, but be aware that in some areas animals are more valuable than humans.

I started implementing PM control measures around the camp because many of the guard forces would have the same illnesses at the same time. I also trained my dentist who was also the clinic custodian to be my PM person. He started enforcing standards around the camp, then the observation posts, and then started educating the locals.

Take advantage of cross training—nothing beats monotony like real hands-on training. This step breaks the routine cycle that usually leads to complacency and it gives personnel a feeling that they are doing something for the locals not just sitting in a foreign land doing nothing.

Be familiar with all your assets; ask yourself where are your patients are going to or coming from. Is it the local clinics, forward surgical teams (FSTs), combat support hospitals (CSHs), local hospitals, or NGOs? They may all inherit your business, or you may inherit theirs. Take the time to talk to them by phone, email, or in person if possible.

Learn to use your big guns. MEDEVAC is the ultimate rapport builder. Nothing says you care more than a helicopter ride. Do not forget local customs; officials may want the body buried within 24 hours if the person expires. Have a plan.

In a UW environment, never rely on true MEDEVAC as a primary mover, especially for indigenous locals. Think taxi evacuation if a patient is ambulatory or stable, or let the patient's family drive him/her. We provided paid trips with lodging. Always give a point of contact and a way to contact patients so they can get prompt treatment on arrival. Most of the time it was a signed document to enter an forward surgical team or combat support hospital.

Nursing shows your dedication toward patients and tells them you genuinely do care for them. 18Ds could use the practice.

Tailgate medicine—there is a place and time for everything. Use this as a tool to entice people to come to your clinic; again, sell yourself. These tailgates should always be unannounced and short in duration to avoid being ambushed. You are just hanging the carrot; entice locals to come to you.

Females are necessary in the clinic, so find them, hire them, and train them. Announce the female staff and any certifications they may have. Women will bring you the children, and they force the men to escort them, so they are a key target to getting more people to come to you. If you do have a female staff, be careful about lending female clinic workers for searches on offensive operations—this could destroy their image. Protect your female staff, chaperone them, and respect customs. Be prepared for rumors, they will spread like wildfire and destroy your credibility. Find the sources of rumors and deal with them swiftly.

Listen to conversations at your clinic; ensure all are listening to what is going on while they are waiting. Talk to patients, ask general questions. Patients may tell you about a build up outside of town that may just be a nuisance to them, but could indicate a future attack on the clinic. If patients tell you they have information, be prepared and get someone to investigate. If you have the space, provide separate treatment rooms that allow privacy. Remember, we are all in the military, not in a civilian hospital. In a UW environment, we all need to do our part and more to maintain an advantage. Listen to what people are saying about the clinic and pay attention to dramatic decreases in patients. Ask what is going on if this does happen. In our case, a rumor had started and within a few days, we went from 60+ patients a day to 20. Rumors will kill your clinic fast, so have a plan and act quickly. In our case, it took two days to find the problem. We immediately got on the radio, had our local doctor talk about it, and dispelled the rumors.

Avoid death cases if possible. If a patient is about to die, have someone explain what is happening to any family members. We revived a 50+ year-old woman with terminal cancer, then had the team leader explain why she was going to die. All the family wanted was time for her to make the trip home so she could pass in peace. We provided that opportunity, and they were grateful.

Knowing the local customs is essential; our local health workers educated us. Local law requires that any unidentified body must be taken to the clinic until identified. So when locals brought in a beheaded body, it showed that the locals had trust in us because there are two local clinics in the town and they brought the body to us.

I relied on all my training to let me know whom I could and could not trust. This was instrumental in asking what was and was not working.

We ended up with three 18Ds, two 68Ws, one corpsman, one indigenous doctor, two females, one dentist/PM/trash man, and one pharmacist. The clinic grew to include three litters for routine sick call, one designated room for females, one area for dental work, and a four litter long-term care area. Over 6,000 patients were seen with over 150 trauma cases, numerous mass casualty situations, and one death due to abdominal trauma. A typical day included up to 100 people including 20+ women and over 25 children.

Our work helped in producing no U.S. casualties and over 300 anti-coalition militia killed in action, timely notifications of rocket and improvised explosive device emplacements, and intelligence leading to discovery of caches and turnover of several munitions.

In conclusion, remember this was a UW clinic at an operational level, meaning there was never a dedicated medic designated to work the clinic. Everything done here was done to:

- Save coalition lives.
- Kill bad guys.
- Provide health care.

Section III: Medical Operations Operation Enduring Freedom–Philippines

CPT O’Neil

CPT O’Neil, provides a brief history detailing the long-standing insurgency in the Philippines. The archipelago has over 1700 islands and consists mostly of Catholics in the north and Muslims in the south. Indonesia has the largest Muslim population in the world, with heavy influences in southern Philippines. The armed forces within the country is limited in resources, funding, intelligence gathering, and war-fighting functions. In 2000, the Armed Forces of the Philippines (AFP) and SOF were heavily involved in counterinsurgency (COIN) operations in Basilan, Pl. Much of the island was controlled by the Abu Sayyaf Group (ASG) that was gaining strength and spreading terrorism to neighboring Zamboanga and Jolo Island.

The population affects the center of gravity (CoG) and capacity building. Information gathering through civil-military operations (CMO) changed the CoG. You have to establish whom you want the local civilians to support. If you want them to support the government and the armed forces, then the answer is simple—you must have the government’s face on the programs. You should refrain from large numbers of U.S. forces. You must work through, by, and with the locals.

The “model of operations” is for the CMO to win over the populace and deny ASG its support base. The model also provides a tool that assists in gathering information from the local populace to identify insurgents. A government face on the program also serves as a force multiplier to AFP intelligence-gathering capabilities. The model will help in the capture and elimination of insurgents on the islands and sustain the peace. CMO (medical civic action programs [MEDCAPs], veterinary civic action programs [VETCAPs], dental civic action program [DENCAPs], surgeries, subject matter expert exchange, and medical seminars) help to get your foot in the door. Assistance with infrastructure (wells, schools, municipal centers, roads, bridges) also builds rapport with the local populace. This model requires that you maintain a presence over time and help instill cooperation with the government. It also provides an avenue to ask, “What has the ASG done for you lately?”

The results observed in the Philippines have been overwhelmingly successful. The ASG initiated combat operations in 2002, received no support, and survivors fled to Jolo Island. The Philippines has seen dramatic economic improvement between 2002 and 2006. It no longer provides a base for insurgent support or activity. The results validated the “Basilan Model.”

MEDCAPs were supported by AFP and U.S. personnel. The programs consisted mostly of medical, dental, and some minor surgery. They normally targeted one, maybe two *barangays* at a time. Common complaints were upper respiratory infections, headaches, joint pain, diabetes, hypertension, cardiovascular disease, and kidney disease. We normally see approximately 500 patients per *barangay*. Minor surgical procedures (cysts, abscesses, lipomas) had an immediate effect and were life changing for some women. Most of the procedures can be done by the 18Ds supervised by the physician assistant (PA) or physician. Risks to consider are complications. Insure you obtain consent, stay within the well-established laws on standard of care, and arrange for follow-up care with host medical office.

We also focused on medical seminars (classroom environment) normally Monday through Wednesday and two days of medical programs (Thursday and Friday). Seminars on women and children health care were most prominent and taught by AFP, Moro National Liberation Front, International Monitoring Team, and U.S. personnel. We added current diseases of importance monthly. Classes on routine obstetrical care, obstetrical emergencies, neonatal care, well child

schedules, abdominal pain, dengue fever, malaria, and current contact information were provided. Measles awareness and tuberculosis treatment programs were invaluable. We continually focused on medical assets interoperability. We insured all students were given a textbook and provided them with graduation photos. We also completed a new medical operations building based on MEDCAP principles. Graduates of the medical seminars set up and managed local medical programs. They were instrumental in administering multivitamins, cough syrup, acetaminophen, and common products such as toothbrushes. The medical providers issued the prescription medication.

Results of the medical seminars were numerous. We taught, treated, and gained access to 15 *barangays*. Seminars created a very organized environment with positive media coverage. We created student rosters and planned follow-up visits. The overall cost for a 500 person *barangay* MEDCAP was \$1,300.00 and for the 3,000 person 15 *barangay* MEDCAP \$5,000.00. We trained 54 assistants for future MEDCAPs.

Section IV: Humanitarian Assistance Operations in Northern Africa

Sean Mulvaney, M.D.

Organizations participate in humanitarian assistance (HA) because non-secular NGOs and their influence allow other missionary activities to occur. It also fulfills a religious duty and provides true humanitarianism. The secular NGOs generally feel organizations are trying to help. HA allows the government at the national level to improve its image, thus allowing other ventures to move forward. Some level of true altruism is present in most HA operations. Why does the military support HA missions in Africa? There is widespread poverty throughout the continent. Educational level is very limited. Employment opportunities, tenuous food supply, desertification, and ambivalent feelings about the U.S. provide an excellent training opportunity. The host nation (HN) must approve all HA operations, and the HN benefits from appearing to bring these services to its citizens. The people truly deserve the service and sometimes our services are lifesaving. HA operations are key to establishing a long-term benevolent presence in an area.

HA operations in Northern Africa are conducted by 1st Battalion, 10th Special Forces Group (Airborne). They have conducted over ten HA missions from 2005 to 2007. They are the primary conductor and coordinator of HA operations in the European theater. We continue to relearn lessons and rebuild the wheel. Air Force Special Operations Command (AFSOC) weighed in heavily on most missions and provided advanced medical personnel.

We conducted a mission in Maradi region, Niger in April 2007. We spent seven days conducting medical and veterinarian operations. The Niger military provided support. We treated 2,696 patients. The predominant patients were pediatric. We also treated 4,888 animals of various sizes. Our team consisted of (U.S. personnel) two physicians, three physicians assistants, two veterinarians, one registered nurse (pharmacy oversight), four medics, one noncommissioned officer in charge, one to two special operations Soldiers as security elements, and Niger military personnel (one physician from the Public Services International company—facilitator and interpreter; 11 Niger soldiers—security and crowd control; and five interpreters—four with the medical team, one with veterinarians). The patients presented numerous infections including nematodes/parasites, diarrhea and dysentery, upper respiratory infections, malaria, skin fungal, lower respiratory infections, eye injuries, ear and other infectious diseases, thrush, and skin problems. The majority of animals treated were sheep and goats. We also treated cattle, horses, donkeys, chickens, and one camel.

The dirty pearls associated with HA missions include detailed planning; logistical support; team preparation; transportation; security; interpreters; executions; and, of course, the after-action review (AAR).

Planning must be coordinated with the embassy (United States Agency for International Development representative and Department of State). The HN regional medical officer must be contacted. You must identify NGOs active in the proposed area. Verify any credentialing and licensing requirements. Make sure you obtain a statement of indemnity. In addition, you will need a limited import/export license. Ask your public affairs officer for guidance.

Logistics involve numerous codes and articles of the United States Code. Title 28, United States Code, states that countries that are not signatories of Article 93, which covers human rights, may not be recipients of humanitarian aid from a U.S. government source. Title 10, Section 25-51 covers large civil affairs medical operations and specifically goes over what funding received under this title can be used for. Title 10, Section 401 covers special forces medical operations

and allows for medical operations in non-Article 93 signatory nations. United States Central Command Regulation 525-23, *Military Operations*, covers cooperative programs for friendly nations, policies, and procedures. Logistics funding is restricted money and subject to audit under Title 10. Items must be entirely expended in the intended country (leave the leftovers). Insure you order and organize supplies before arriving and once you reach your destination.

Team preparedness is very important. Attached personnel should arrive at least a week before departure. Make sure you check and double-check all equipment. Current weapons qualification, immunization, and any prophylaxis must be verified and completed prior to deployment. You must conduct both mission briefs and culture briefs to all of the team participating. Cash must be accounted for and a log of all expenditures maintained.

Transportation of weapons and drugs must be coordinated with appropriate organizations. Pallets should be identified and inventoried. Insure you have a bump plan established and are prepared. There are reliable rental vehicles in Africa, but you must insure you inspect the vehicles thoroughly. If you fly commercial air in Africa, prior coordination is necessary.

Remember you are a prime target. Be conservative with your security assessment. Focus on fixed locations and remember that attached medical personnel are not team people. Develop and brief a solid plan for contact at billeting sites, medical sites, and convoy routes. Security should be maintained and emphasized on a daily basis.

Interpreters should speak the dialect you need. Insure in the mission plan you know the appropriate dialect for that region. Make sure you vet them with a native speaker. Recommend you put your best interpreter in the pharmacy. The dilemmas with NGOs will surely arise and must be addressed in a professional manner.

Execution of the mission requires crowd control. You need to set the expectation. Have some giveaways. Establish and maintain good patient flow. We utilized an outer cordon establishing a main line, which led to the screening station. The screening station had an on-deck line and from there patients were screened with host care provider interaction, directed to the pharmacy, and finally out the exit. You must control the crowd. When treating patients, keep it simple. Write scripts and send them to pharmacy. Procedures should be handled by one health care provider (HCP).

The pharmacy must maintain a safety profile. Organize drugs in Pelican weapons cases. Establish one pharmacy station per two HCPs. Bring water for the pharmacy to both drink and mix powders. De-worming and Vitamin A medications are necessary. Candy makes a great giveaway. The most important thing to do is relax.

After the mission, ensure you conduct a thorough AAR. Restock all of your supplies. Conduct any vehicle maintenance required. Do a tally of HCP, pharmacy, and burn rate. Ensure your team health has been taken care of.

Section V: Tactical Detainee Healthcare

LTC Mark Trawinski

Detainees are divided into categories. These categories include enemy prisoners of war (EPWs), retained personnel, and civilian internees. A tactical holding facility (THF), commonly referred to as a temporary holding facility, typically permits 14 days of confinement. The treatment of EPWs, retained personnel, civilian internees, and detainees is governed under Army Regulation 190-8. International principals are guided by the Geneva Conventions and the Hague Convention, and the United Nations General Assembly proclamation of 1982 governs detainee care. The U.S. is a signatory. Current DOD policy is compliance with international law. Department of Army guidance is addressed in *Medical Ethics and Detainee Healthcare Operations*, DOD Instruction 2310.08E, dated Oct 05. The Army states cultural sensitivity is necessary and specifically prohibits routine rectal exams. The question was raised, “Why be humane?” Numerous reasons include statutory requirements, medical ethics, enhanced intelligence gathering, common justice, goodwill, and future effects on generations.

Effective detainee health operations include initial actions on the objective, in-processing, daily checks, sick call, release and transfer actions, and possible medical evacuation.

Initial Actions on the Objective

Security must be provided to the detainees. This protection may include segregation of detainees; protection from HN support, protection from other detainees; and, most importantly, protection from U.S. forces. Triage detainees, obtain their medical and medication history, and transport them appropriately.

In processing

In processing should be conducted by an advanced tactical provider at a minimum. Ensure you get a complete history and conduct a physical. Document all injuries, develop your assessment and plan, and ensure your assessment and plan is reviewed and cosigned by a provider within 24 hours.

Daily Detainee Health

Make daily checks of all detainees and provide documentation and keep as a record. Sick call should be conducted with appropriate medication dosing and charting administered. Address the overall adequacies of food, water, sanitation, pest control, and living accommodations daily. React to all emergencies appropriately.

Disposition

Upon release/repatriation, conduct a physical exam, do appropriate evaluation, and document. Provide a transfer and/or evacuation note on all detainees.

Lessons Learned

Security

Consider tactical, physical, and operations security.

Equipment

THF increases the requirement for Class VIII supplies. Common analgesics, antacids, antiemetic, and antihistamines may increase based on the overall health of the detainees. Diseases endemic to the area have probably not been treated prior. Proper nursing care and prevention of infection increase the need for bandages. Equipment for daily vital signs and basic medical care increase based on population, and every effort has to be made to maintain the appropriate level of health care.

Medical support (next level)

Awareness of facilities in the area of operation is necessary. Questions to ask include: “Is there a detention facility with medical capability and a means to evacuate?” “If evacuation is to a CSH, is security required?” You must first determine the detainee's current health posture (injured/sick) by answering the question, “Is he fit for detention?”

Malingers

Malingers may include those who do not want to “work quicker”; drama may be part of their culture. You must evaluate and consider healing the healthy versus the negative consequences.

Chest pain

Consider the risk factors associated with chest pains. Evaluate and do a risk assessment, and then ignore, treat, or evacuate.

Chronic disease

Avoid the MEDCAP mentality. If you cannot follow up, do not start treatment. Exception: “quid pro quo.”

The role of psychologists is beyond my scope. This is a thankless, but essential mission. You must document and maintain medical records by ISN. Plan for it and insure you resource for it.

—LTC Mark Trawinski, M.D., Fort Campbell, KY

Emergency War Surgery Handbook—Principles of Medical Ethics

Principle 1— Health personnel, particularly physicians, charged with the medical care of prisoners and detainees, have a duty to provide them with protection of their physical and mental health and treatment of disease of the same quality and standard as is afforded to those who are not imprisoned or detained.

Principle 2 – It is gross contravention of medical ethics, as well as an offence under applicable international instruments, for health personnel, particularly physicians, to engage, actively or passively, in acts which constitute participation in, complicity in, incitement to or attempts to commit torture or other cruel, inhuman or degrading treatment or punishment.

Principle 3 – It is a contravention of medical ethics for health personnel, particularly physicians, to be involved in any professional relationship with prisoners or detainees the purpose of which is not solely to evaluate, protect, or improve their physical and mental health.

Principle 4 – It is a contravention of medical ethics for health personnel particularly physicians: (a) to apply their knowledge and skills in order to assist in the interrogation of prisoners and detainees and which is not in accordance with the relevant international instruments; (b) to certify, or to participate in the certification of, the fitness of prisoners or detainees for any form of treatment or punishment that may adversely affect their physical or mental health and which is not in accordance with the relevant international instruments, or to participate in any way in the infliction of any such treatment or punishment which is not in accordance with the relevant international instruments.

Principle 5 – It is a contravention of medical ethics for health personnel, particularly physicians, to participate in any procedure for restraining a prisoner or detainee unless such a procedure is determined in accordance with purely medical criteria as being necessary for the protection of the physical or mental health of the safety of the prisoner or detainee himself, of his fellow prisoners or detainees, or of his guardians, and presents no hazard to his physical or mental health.

Principle 6 – There may be no derogation from the foregoing principles on any ground whatsoever, including public emergency.

** For the purpose of this declaration, torture means any act by which severe pain or suffering, whether physical or mental, is intentionally inflicted by or at the instigation of a public official on a person for such purposes as obtaining from him or a third person information or confession, punishing him for an act he has committed or is suspected of having committed, or intimidating him or other persons. It does not include pain or suffering arising only from, inherent in or incidental to, lawful sanctions to the extent consistent with the Standard Minimum Rules for the Treatment of Prisoners.**

** Torture constitutes an aggravated and deliberate form of cruel, inhuman or degrading treatment or punishment. **

Section VI: Critical Care Medical Evacuation

LTC Mark Framstad, Dewitt

LTC Framstad's objectives included discussions on echelons of care in the current environment, critical medical evacuation (MEDEVAC) preparation (patient and equipment), and MEDEVAC environment considerations.

The current care echelons are:

- Echelon I – First aid, resuscitation.
- Echelon II – Life saving techniques/procedures: Damage control, surgery/external fixations (ex-fix).
- Echelon III – Ex-fix, 1st order amputation, laparotomy, thoracotomy, vascular surgery, soft tissue debridement:
 - Usually no neurologic/ophthalmological/urologic surgery
 - May have computed tomography (CT) scanner
 - Decision for transfer to Echelon IV or out of theater.
- Echelon IV – Neurosurgery, ophthalmology, urology: No bypass capabilities, no rehabilitation capabilities.

Special operations medicine normally encompasses both Echelon I and II. The type of care and facilities are depicted below:

- Echelon I: Combat medic, battle aid station (BAS)
- Echelon II: Forward surgical team (FST), medical company: 24 hour holding
- Echelon III:
 - CSH, mobile Army surgical hospital
 - 72 hour holding
- Echelon IV:
 - CSH, field hospital, hospital ship
 - 72 hours or greater

Evacuation times normally are 10-30 minutes (Level I-II, II- III), 10-60 minutes (Level I-III, II-IV), 10-60 minutes (Level I-III, II-IV), 10-180 minutes (Level I-IV), and 30-120 minutes (Level III-IV). These evacuation times are the norms, but medical planning has to be completed and all avenues of evacuation reviewed before all operations.

Medical care decisions to consider are:

- What can you do?
- What can the next level do?
- What does patient need next?
- How soon?
- How much time to the next level?

Most importantly is how to transport patients without secondary injury. When it is time to fly, notify operations and flight crew with the number of patients, type of equipment, and how soon. Find out if there will be a tail-to-tail transfer. Ensure patient and equipment preparation and notify gaining units.

Patient preparation should include the following:

- Airway:
 - Intubate:
 - * Low GCS (<8), severe facial trauma, lung injury.
 - * Stability of patient/multi-trauma.
 - * Surgery required at next location.
 - * Aspiration risk.
 - Natural airway:
 - * Reflexes must be intact.
 - * Position: sitting/reclining/lateral (avoid supine position!).
 - * Supplemental oxygen (facemask, nasal cannula).
 - Secured airway:
 - * Endotracheal tube(ETT).
 - * Physically secure ETT (holder, cloth tape, suture).
 - * Ventilation versus spontaneous ventilation.
 - * Rescue equipment for flight.

- Unsecured airway:
 - * LMA, Combitube.
 - * Major risk is loss of airway and aspiration.
- Breathing:
 - Ambu-bag, ventilator, Jackson-Reese.
 - Supplemental oxygen: 100% SpO2 not required.
 - Need to assess ventilation: CO2 monitor, visual inspection, feel.
 - Chest tubes equals Heimlich valves.
- Circulation:
 - Bleeding; pressure, tourniquets, ligation.
 - IV access:
 - * PIV, central line, intra-osseous line.
 - * Accessibility in flight.
 - * IV fluids on pressure bags; take air out of bags.
 - Fractures stabilized.
 - Prepare for ongoing resuscitation:
 - * Extra IV fluids.
 - * Colloid/blood if needed.
 - * Foley catheter; especially for mannitol.

Equipment preparation should include the following:

- Monitors:
 - PROPAC (w/ETCO2 if available).
 - Arterial line.
 - Extra pulse oximeter.

- Aid bag:
 - Extra syringes, needles.
 - Drugs/drug box.
 - Blood tubing/pressure bags.
 - Airway equipment.
- Suction

Medication preparation includes the following:

- Sedation drugs:
 - Versed (1mg/ml).
 - * 50ml bag.
 - * Give 2-5 mg q 10-20 min.
 - Fentanyl (50mcg/ml):
 - * Leave in vials.
 - * Give 1-2ml q 10-20 min.
 - Morphine: Consider a bag with 1mg/ml (50 mls).
 - Muscle relaxants (vecuronium, rocuronium):
 - * Rocuronium: 100mg (1 vial) lasts approx 45-75 min.
 - * Vecuronium: 10mg (1 vial) lasts approx 30-45 min.
- Emergency drugs:
 - Ephedrine:
 - * 5-10mg/ml mixture.
 - * 50ml bag.
 - * Give 1-3ml every 10-15 min.
 - * Tachyphylaxis

- Phenylephrine:
 - * 1 vial in 250ml bag = 40mcg/ml (2-3ml as needed).
 - * 1 vial in 100ml bag = 100mcg/ml (1 ml as needed).
- Epinephrine:
 - * 10 mcg/ml (give 1–2 ml for severe hypotension).
 - * Advanced cardiac life support protocol.

Patient preparation should include the following:

- Patient's personal effects, chart, x-rays.
- Patient considerations:
 - Patient wrapped for warmth.
 - Litter straps for patient and equipment.
 - IV is accessible.
 - Ventilator and PROPAC visible
- Do not forget equipment exchange for tail to tail

Environmental considerations of MEDEVAC:

- Lack of space:
 - Difficult to access patient/equipment.
 - Difficult to work/maneuver.
 - Equipment needs to be organized and systematic:
 - * Monitor lines: straight, covered, out of the way.
 - * IV lines: main avail, secondary hidden.
 - * Ventilator: on top of everything!
 - * Aid bag, foley, oxygen; Pleura-vac readily accessible.
- Noise:
 - Poor communication; use headsets, pen and paper.

- Visual cues:
 - * Placement of equipment/monitors/patient.
 - * Frequent manual checks (vent, monitors).
- Hearing protection for provider and patient.
- Lack of light:
 - Loss of visual cues:
 - Difficult to work; know your equipment.
 - Approved light source available.
 - Systematic/organized equipment:
 - * Drugs pre-mixed, known concentrations.
 - * Standardize your equipment/drugs.
 - * Easily accessible location.
- Vibration:
 - Monitors/equipment interference:
 - * Blood pressure: NIBP often unreliable/non-functional; palpate; consider invasive pressure monitor.
 - * SpO2 and electrocardiogram: Consider alternate locations.
 - Nausea and vomiting (patient and provider): Prophylaxis and protection (avoid aspiration!).
- Thermal changes:
 - Convective, radiant, and evaporative heat loss.
 - Drastic ambient temperature changes.
 - Cover/wrap patient.
 - Solution adds to difficulty assessing and treating patient.

Overall you need to ensure you are organized. You should standardized your setup and become familiar with your equipment and environment. Always anticipate the most likely, harmful, or treatable complications. Be flexible and improvise.

Doctrinal Changes from the AMEDD

Roles of medical care—formerly echelons of care

Role 1

The first medical care a Soldier receives is provided at Role 1 (also referred to as unit-level medical care). This role of care includes:

- Immediate lifesaving measures.
- Disease and nonbattle injury prevention.
- Combat and operational stress preventive measures.
- Patient location and acquisition (collection).
- Medical evacuation from supported units (point of injury or wounding, company aid posts, or casualty/patient collecting points [CCPs]) to supporting medical treatment facilities.

Treatment provided by designated combat medics or treatment squads. (Major emphasis is placed on those measures necessary for the patient to return to duty or to stabilize him and allow for his evacuation to the next role of care. These measures include maintaining the airway, stopping bleeding, preventing shock, protecting wounds, immobilizing fractures, and other emergency measures, as indicated.)

Nonmedical personnel performing Role 1 first-aid procedures assist the combat medic in his duties. First aid is administered by an individual (self-aid/buddy aid) and enhanced first aid by the combat lifesaver.

Self-aid and buddy aid: Each individual Soldier is trained to be proficient in a variety of specific first-aid procedures. These procedures include aid for chemical casualties with particular emphasis on lifesaving tasks. This training enables the Soldier or a buddy to apply first aid to alleviate a life-threatening situation.

Combat lifesaver: The CLS is a nonmedical Soldier selected by his unit commander for additional training beyond basic first-aid procedures. A minimum of one individual per squad, crew, team, or equivalent-size unit should be trained. The primary duty of this individual does not change. The additional duty of the CLS is to provide enhanced first aid for injuries based on his training before the combat medic arrives. Combat lifesaver training is normally provided by medical personnel assigned, attached, or in sustainment units. The senior medical person designated by the commander manages the training program.

Medical personnel: Role 1 medical treatment is provided by the combat medic or by the physician, the physician assistant (PA), or the health care specialist in the battalion aid station (BAS). In Army SOF, Role 1 treatment is provided by special operations combat medics; special operations medical sergeants; or physicians and PAs at forward operating bases, special operations bases, or in joint special operations task force AO.

Emergency medical treatment (immediate far forward care) consists of those lifesaving steps that do not require the knowledge and skills of a physician. The combat medic is the first individual

in the medical chain who makes medically-substantiated decisions based on medical military occupational specialty (MOS)-specific training.

At the BAS, the physician and the PA in a treatment squad are trained and equipped to provide routine sick call when the tactical situation permits. Like elements provide this role of medical care to brigades, division, corps, and echelon above corps units.

Role 2

At this role, care is rendered at the Role 2 MTF, which is operated by the treatment platoon of medical companies/troops. Here, the patient is examined and his wounds and general medical condition are evaluated to determine his treatment and evacuation precedence, as a single patient among other patients. Advanced trauma management and emergency medical treatment including beginning resuscitation is continued, and, if necessary, additional emergency measures are instituted, but they do not go beyond the measures dictated by immediate necessities. The Role 2 MTF has the capability to provide packed red blood cells (PRBCs) (liquid), limited x-ray, laboratory, and dental support.

Role 2 AHS assets are located in the:

- Medical company brigade support battalion, assigned modular brigades that include the heavy brigade combat team (HBCT), infantry brigade combat team (IBCT), the Stryker brigade combat team (SBCT), and the medical troop in ARC.
- Medical company (area support) an echelon above brigade (EAB) asset that provides direct support to the modular division and support to EAB units.
- Preventive medicine and combat and operational stress control assets are also located in the brigade support medical company and area support medical company.

Those patients who can return to duty within 72 hours (1 to 3 days) are held for treatment. Patients who are nontransportable due to their medical condition may require resuscitative surgical care from an FST collocated with a medical company/troop. (A discussion of the FST is contained in FM 4-02.25.)

This role of care provides medical evacuation from Role 1 MTFs and also provides Role 1 medical treatment on an area support basis for units without organic Role 1 resources.

Role 3

At Role 3, the patient is treated in a MTF staffed and equipped to provide care to all categories of patients, to include resuscitation, initial wound surgery, and postoperative treatment. This role of care expands the support provided at Role 2. Patients who are unable to tolerate and survive movement over long distances receive surgical care in a hospital as close to the division rear boundary as the tactical situation allows. This role includes provisions for:

- Evacuating patients from supported units.
- Providing care for all categories of patients in an MTF with the proper staff and equipment.
- Providing support on an area basis to units without organic medical assets.

Role 4

Role 4 medical care is found in continental U.S.-base hospitals and other safe havens. Mobilization requires expansion of military hospital capacities and the inclusion of Department of Veterans Affairs (VA) and civilian hospital beds in the National Disaster Medical System to meet the increased demands created by the evacuation of patients from the area of operations. The support-base hospitals represent the most definitive medical care available within the AHS.

Section VII: Medical Complications with Suicide Attacks

LTC Ostfeld Ishay, M.D.

A terror suicide attack is an act of terror carried out by an insurgent planning to die in action in order to become a “Shaid.” To prepare for being a “Shaid,” individuals must do spiritual and materialistic actions, participate in a religious ceremony, and complete a typed testament. The “human vector” serves as the smart guidance mechanism to carry out a terror attack on a specific target. The worldwide extent of suicide attacks encompasses many countries.

There are two distinct types of suicide attacks (shooting and bombing). Examples of shooting attacks in the United States include the Virginia Tech shooting and the incident at the Omaha, Nebraska mall. Finland also experienced a shooting attack at the Jokela School in 2007. Bombing attacks normally occur in either an open or a closed space. Bombing suicide attacks are also associated with very heavy charges. Buses are known targets and have been involved in numerous closed space bombings. Known closed space bombings have been documented in Jerusalem, Israel-2000, London, England-2005, Afghanistan-2007, and Tolyatti, Russia-2007. Bombing suicide attacks in Israel since April 1993 through December 2007 have included 120 events and killed 719 people. Suicide attacks that contained heavy charges have occurred at the U.S. Marine barracks Beirut, Lebanon in 1983, Khobar towers Saudi Arabia in 1996, and recently at the Hilton-Taba hotel in Sinai Peninsula in 2004.

Medical patterns associated with suicide attacks include blast-related injuries, burns, and metal shrapnel and bone fragments. In Israel, there were 47,500 trauma patients from January 2000 through December 2002. Three percent of those injured were a result of terror-related injuries. Terror-related injuries are not gender related and affect male and female, young and old. Pattern of injuries may include open wounds, internal injuries, fractures, contusions, or superficial wounds. A breakdown reveals that six events occurred in an open space resulting in 419 victims, four occurred in closed space with 375 victims, and seven occurred in buses resulting in 394 victims. Medical patterns show the highest percentage of injuries are normally head and neck with extremities in close proximity.

The future of suicide attacks may include the use of Sarin gas, Anthrax, or Polonium 210. Incidental events such as the postal letter to Senator Daschle that occurred in Washington, D.C. in October 2001 and the use of Polonium 210 against Alexander Litvinenko in November 2006 show the potential of future insurgents’ willingness to conduct mass killings. The availability of supplies have already lead to the use of sodium cyanide—NYC World Trade Center, February 1993, planning of the dirty bomb—London, August 2004, and the use of chlorine gas—Iraq combined suicide bombings attacks, April 2007. In Israel, it has lead to attempts of using sodium cyanide for mass poisoning, hitting commercial gas terminals, hitting stores containing industrial hazard material, and using carriers of human immunodeficiency virus and Hepatitis B and C as suicide bombers.

Suicide attacks are common worldwide. In Israel, there are mainly two types of suicides attacks (bombing and shooting). Suicide attacks have unique medical profiles that include severe injuries and a higher mortality rates. Shooting victims normally die immediately or survive, as opposed to bombing victims who suffer multiple system injuries for longer periods. Bus bombing victims typically suffer from head and neck injuries and mortality is increased. In Israel, “scoop and run” has replaced the field triage concept. All severely injured patients are normally evacuated within 30 minutes and into surgery within 90 minutes. Victims of suicide attacks need extra surgery and an increase in ICU resources. In Israel, secondary referral to a trauma center is uncommon. Future suicide attacks may involve chemical, biological, radiological, and nuclear capabilities that may create mega-casualty events.

Section VIII: MEDCAPS and COWCRAP

Commonly understood terms for medical civil-military operations (CMO) are MEDCAP/VETCAP, CMA, and village medical outreach (VMO). The purpose of medical CMO is to buy political capital. It is a CMO designed to support the commander's intent in shaping the operational environment, winning the confidence and trust of the indigenous people, promoting the legitimacy and interests of the host nation government, and creating conditions for sustainable victory. It does not build capacity. We know and accept that. Medical CMO missions are not designed to bring medical, dental, or veterinary services to the under served areas of the host nation. CMO missions are effective only if the right conditions exist—poverty, disease, hopelessness, lack of adequate public health infrastructure. It would not work in Detroit and these operations will not solve the healthcare needs of the nation.

Medical CMO tactics, techniques, and procedures must be based on established medical practices and conform to sound principles of public health and hygiene. One must be careful to follow the *primum non nocere* (first, do no harm) dictum and to promote, as nearly as possible, the priorities established by the Host Nation Ministry of Public Health. Medical CMO provide short/mid-term benefits to the populace and long-term benefits to the host nation government and coalition forces.

An example is the Afghanistan CMA cell. Mission sets included VMO programs for medical, dental, and veterinary clinics. We also conducted professional seminars for medical/veterinary schools. We also provided limited medical facility assessments and immunization coverage mapping. We conducted the largest water quality survey since the 1970s. Capacity building included the recruitment, procurement, and distribution of medical and veterinary books and equipment. We collected, preserved and transported numerous biological specimens.

CMA events from 15 June 2003 through 6 April 2007 have resulted in 104,762 local nationals and 149,004 animals being treated. Over 130 missions in 25 provinces have been conducted. The CMA cell has served as the theater's primary, quick-response cell and was established under the Coalition Joint Civil Military Operations Task Force in May 2003.

Civil military action provides a means of passive intelligence. It provides the commander with an immediate impact—no waiting for funding, contracting, or construction. It provides an avenue for positive personal interaction with the local nationals (LNs) on their turf. It is a chance to feel the pulse of local opinion toward coalition forces and the government of Afghanistan. It can change contrary attitude and sentiments and is a venue for maintaining and strengthening good relationships. It is a means of working with and mentoring LN medical personnel and assessing healthcare in remote areas. It provides the potential for lasting public health benefits through immunizations, case finding, and health and hygiene teaching.

COWCRAP

Maneuver commanders do not always understand what they are asking for when they request medical CMOs. They tend to utilize the toolbox approach to successful battalion command. The measures of effectiveness are difficult to capture and cannot be measured by patient volume. A medical CMO is not always the right approach. To avoid the COWCRAP, you must coordinate everything with everyone and then coordinate it again. Do not offer services not in keeping with Ministry of Public Health priorities. You must use, support, and improve the existing health care infrastructure (clinics and hospitals) where they exist. Do not set up competition with them creating an expectation that you will be there beyond mission requirements. You must invite the LN healthcare providers to participate and assist them. Observe the cultural norms—women are

seen by female providers with female interpreters in most Islamic countries. Ensure U.S. providers stay within their professional scope of practice. Military medical personnel are personally responsible for those working under their directions/license. Talk to local providers and NGO sponsors before setting up shop. You should plan for referrals of patients who need care beyond your clinical capability. Do not assume a superior attitude or talk down to LN providers or patients. Ensure you provide services that provide a lasting benefit, and do not assume locally procured medications are okay for the locals.

Section IX: 75th Ranger Regiment Casualty Response in GWOT

Background

The current Ranger force is the largest in history (predating the Revolutionary War) and has been engaged in combat operations longer than any other Ranger force. The Rangers have been engaged/deployed continuously since October 2001 to OEF and since March 2003 to OIF. They also have been involved in other GWOT missions/operations. They have performed every aspect of Ranger mission profiles (from squad to regiment level). The officers have completed 3-5 rotations, noncommissioned officers, 5-7 rotations, and junior enlisted, 2-4 rotations.

The Rangers have produced a Ranger medic (RMED) handbook, copyrighted by Dr. Hammesfahr, with all proceeds donated to Wounded Warrior Foundations. The RMED is broken down into five parts:

1. Mission, Scope of Practice, and Guidelines
2. Protocols and Procedures
3. Pharmacology
4. Planning and Operations
5. Packing Lists and Key References

Part 2 (Protocols and Procedures) addresses tactical trauma assessment, medical patient assessment, airway management, hemorrhage management, thoracic trauma management, hypovolemic shock management, head injury management, seizure management, TBI management, orthopedic management, burn management, pain management, anaphylactic shock, hyper/hypothermia management, altitude emergency, and behavior emergency. The RMED tactical medical emergency protocols cover a wide range of medical conditions from acute abdomen to urinary tract infections. Each protocol defines the medical emergency; identifies signs, symptoms, and management; and recommends disposition of patient. The RMED pharmacology identifies drugs medics should be familiar with and carry.

The Rangers have also developed a Ranger First Responder (RFR) 3.0 course for medics and shooters. It uses the acronym CRITICAL to identify the critical skills and tasks associated with trauma on the battlefield:

- C-Contain scene and assess casualties.
- R-Rapidly identify and control massive hemorrhage.
- I-inspect and ensure patients airway.
- T-Treat life threatening chest injuries.
- I-Inspect for bleeding, gain IV access, manage shock.
- C-Control pain and prevent infection.
- A-Aid and litter team.

- L-Leader coordinated evacuation.

The course is taught in training blocks:

- Block 1- Ranger training methodology and TCCC.
- Block 2 – Critical task modules.
- Block 3 – Trauma lane scenarios.
- Block 4 – Written test.

Medics are required to complete a detailed tactical casualty card within 72 hours post-mission on every Ranger casualty and other significant casualties. These cards are emailed up the medical chain and posted on RMED portal to allow constant review. They also utilize a trauma registry, which is primarily for casualties evacuated out of theater.

The following situations were presented to the SOMA conference. They reflect actual missions performed by the Ranger Regiment in support of OEF missions in Afghanistan.

Situation #1: Two squads plus enablers (approximately 20 personnel with one medic) located in Afghanistan with low illumination and temperature around 70 degrees Fahrenheit.

The mission was to kill/capture targeting al-Qaeda and foreign fighter leadership present. Primary casualty evacuation (CASEVAC) consisted of organic helicopters with flight surgeon and medic on board. Secondary CASEVAC was U.S. Army MEDEVAC. Execution of mission was to split our assault force, focus on two primary locations, and provide support by fire as we cleared our objectives. We encountered automatic weapons fire from a ridge to the north. We continued to clear the ridge line, but enemy threw a grenade over his back towards the squad. We sustained four wounded casualties. I treated two casualties on the south side of the ridge about 10 meters apart. One casualty was carried to the designated casualty collection point, and one was walking wounded. First responders provided initial care to three of the casualties, which included a saline lock, tourniquet, and Israeli dressing to hold Asherman in place. Evacuation was difficult due to obstacles and terrain. The rocky terrain allowed for slow movement with all casualties transported utilizing one- and two-man buddy carries, except for one casualty transported on a talon litter. Casualties were loaded into two CH-47s for evacuation to the FST.

Lessons learned:

- Expose your patient (entry and exit wounds).
- Asherman improvement.
- Minimum two medics per platoon.
- Personal bleeder kits.
- TQ pain management.

Situations #2: Location Afghanistan with mission to conduct nighttime raid on set compound to kill/capture known enemy combatant in order to disrupt insurgent activities and gain intelligence on insurgent network.

Medical assets include company senior medic, senior platoon medic, flight medic on non-standard medical platform (CH-47), and CASEVAC to CSH supported by special operations medical team and local dust off. Mission executed and two casualties identified for pick-up. CH-47 (CASEVAC) launched to holding pattern, radio link-up established from route clearance element, and pick up completed for two casualties. Last objective results in suicide vest detonation with five wounded in action, requiring dedicated CASEVAC to return for exfiltrate of four wounded in action with one staying on target.

Lessons learned:

- Medical plan is imperative to utilize all assets.
- Radio calls must be short and concise.
- Use of RFRs was vital to the success of the mission.
- Leaders need to know how to use their medical assets and how to run a CCP.

Section X: Hoist Planning and Casualty Vignettes from OEF–Afghanistan

160th Special Operations Aviation (Airborne)

Although brief in nature, these presentations serve as lessons learned to numerous special operations medical personnel, civilian counterparts (policemen, firefighters, paramedics) whose day-to-day jobs expose them to various degrees of trauma, and foreign military within the special operations community whose GWOT continues both at home and in various theaters of operations.

Situation #1: Mid September, Afghanistan, weather cold, 11 degrees Celsius, an aviation unit with no visual flight references, was flying via instruments into unknown valleys and marginal visibility to 10,200 AGL.

Mission was to insert approximately 400 troops into key terrain, locate high-value targets and reclaim mountain and valley passes for coalition forces. Task organization included 12-MH-47s for assault, 2 dedicated CH-47s for CASEVAC, 1 combat search and rescue (CSAR), and 2 back up HH-60s for daytime CASEVAC/CSAR missions. Ground medics were to provide necessary medical treatment on the ground with a flight medic and surgeon dedicated for every two aircraft. CASEVAC had been identified and coordination for evacuation to nearest CSH. Planning factors included infiltration of 37 personnel over two periods of darkness with 17 identified for infiltrated over 7,500 mean sea level (MSL). Most of the task force could only be infiltrated utilizing fast rope techniques. All landing zones (LZs) were time driven and required refueling of all aircraft during turns. Infiltration also was ongoing from darkness into daylight and involved all aircraft. The 60 platforms were limited based on altitude restrictions, and the two CH-47 aircraft had limitations of no fast rope capability, no rappelling, and no hoist capability.

Lessons learned:

- Know in detail all participating aircraft limitations and capabilities especially in higher elevations.
- Know all aspects of plan: look at timing, time on target, and deconfliction.
- Always be prepared for emergency CASEVAC after fast roping because injuries are inherent on certain infiltration profiles.
- Never rule out and always have in the back of your mind acute mountain sickness, high altitude pulmonary edema, and high altitude cerebral edema as these signs and symptoms can mimic other life-threatening injuries. Altitude will affect in some degree a certain amount of the assault force.

Situation #2: Aviation unit, eastern Afghanistan, steep terrain 8000-10000 MSL, limited fuel capability due to extreme weather temperatures and elevation.

Mission was CASEVAC utilizing hoist extraction for multiple patients. CASEVAC request indicated three ambulatory patients (Pt #1-AMS, Pt #2-groin pull, Pt #3-lower extremity FX). All patients' locations were identified as HLZ-A. Upon arrival at HLZ-A, picked up Pt #1 and was informed the other two patients were at a higher location approximately 10,000 ft MSL HLZ-B. HLZ-B required medic to be inserted via hoist. Ground medic confirmed that CASEVAC request was not accurate and that Pt #3 had a possible pelvic FX requiring extraction

by hoist/stokes litter. Performed tandem hoist extraction with patients 2 and 3, reassessed prior treatment while in flight, and handed over care to next echelon at forward operating base.

Lessons learned:

- Communication is important.
- Do not expect the CASEVAC reports to always be accurate.
- Pre-briefing hoist operations with supported ground troop is a must.
- Stay flexible.

Situation #3: Aviation unit, southern Afghanistan, early spring with steep terrain 8700 MSL, reduced visibility, temperature 18-21 Celsius, and known al-Qaeda/facilitators in the area.

Mission was to insert 70 plus Soldiers into large enemy-held compound via three infiltration sites. Infiltration would include fast roping onto a roof due to uneven terrain with overhead support. CASEVAC included one PA and one flight medic with full CASEVAC set on assault MH-47 with a backup MH-47 with one flight medic and CASEVAC set. CASEVAC plan: Once approved for launch, fly to designated CASEVAC helicopter LZ, load patient, provide treatment enroute to nearest CSH. Execution of mission was completed and call initiated that a Soldier was injured during infiltration. CASEVAC launched and approximately 10 minutes out, received a call that patient would need to be hoisted. Medic was lowered via jungle penetrator, and with assistance from ground, patient was packaged and hoisted into aircraft and transported to nearest CSH.

Lessons learned:

- Never assume a patient will be packaged.
- Do radio checks before each mission.
- Mission preparation must consider all that could go wrong and plan for those events.

**** Note:** Patient described in Situation #3 had fracture at T-5 and T-6 with no loss of sensory or motor function and no other injuries. Local CSH applied a fixator and transported patient back to United States. Soldier has returned to his unit and deployed multiple times since his injury.

Section XI: Plastic Surgery in Modern Warfare

**LTC Barry Martin, M.D., Chief of Plastic Surgery,
Walter Reed Army Medical Center**

To become a surgeon, one must find a war.

–Hippocrates

Operation Iraqi Freedom has produced the highest volume of casualties since the Vietnam War. The survivability rate has increased to greater than 90 percent. This percentage is based on the critical care provided on the battlefield, body armor, damage control operations, and expedient trauma transport system. Injury patterns show a predominance of head and extremity injuries. Research indicates approximately 13-31 percent of patients sustain head and/or neck injuries.

The current treatment and evacuation scheme in Iraq for initial care is the front-line medic, battalion aid station, FST, and CSH. At that point, the patient is transported to stabilization/emergent care at Landstuhl Regional Medical Center (LRMC). The current configuration at LRMC is 240 beds, an 18-bed intensive care unit, and 8 operating rooms. Initial trauma craniotomies and stabilization were performed in Iraq. The remainder of acute care and subsequent reconstructive procedures occurred at Walter Reed Army Medical Center (WRAMC). The craniofacial implant reconstruction was performed with or without flap coverage, based on tissue need. Critical Care Air Transport (CCAT) to WRAMC normally occurs within a 7-9 day window from point of injury. Our goal is to clean, cover, and transport patients to the continental U.S. (CONUS).

There are major reconstructive challenges. These challenges are based on a large zone of injury, associated injuries, and the multiplicity of trauma. Craniofacial reconstruction requires multidisciplinary planning. All patients are discussed at a multidisciplinary team meeting to plan implants and surgical approach. CT imaging occurs and a stereolithic skull model is constructed. After CT imaging, a custom 3D prefabricated polymethylmethacrylate (PMMA) implant is created. The implant pattern is created by a mirror image that generates the implant design. It is trimmed to fit the defected side. A template is created, and PMMA is poured into a mold-hardened and polished form. Soft tissue flaps are required to complete the process. Cases vary from IED injuries, 155-mm round injuries, sniper fire, blast injuries, and improvised explosive device fragment injuries.

WRAMC craniofacial reconstruction reviews have included 111 cranial, 30 complex facial, 15 orbit, 35 maxillary/midface, and 51 mandible for a total of 242 craniofacial injuries. Free flap reconstruction totaled 16 with no flap losses and 1 venous congestion (leech). Eight involved the radial forearm (two osseocutaneous), one ALT, one Latissimus (vein graft), and six osseocutaneous fibula. Local flaps included seven paramedian forehead, four mustarde, one foot and ankle ability measure, five rotations, and again no flap losses.

Plastic surgery is complex and requires all of the latest technological equipment to insure the patients well being. The initial treatment and resulting definitive care plays an important role in our ability for optimal results. Remember clean, cover, and transport to CONUS as soon as possible.

References

1. G.E. Peoples, T. Gerlinger, R. Craig, and B. Burlingame, "Combat Casualties in Afghanistan Cared for by a Single Forward Surgical Team during the Initial Phases of Operation Enduring Freedom," *Military Medicine*, 170(6):462-8, June 2005.
2. M.S. Xydakis, M.D. Fravell, K.E. Nasser, and J.D. Casler, "Analysis of Battlefield Head and Neck Injuries in Iraq and Afghanistan," *Otolaryngology Head & Neck Surgery*, 133(4):497-504, Oct. 2005.
3. S.P. Montgomery, C.W. Swiecki, and C.D. Shriver, "The Evaluation of Casualties from Operation Iraqi Freedom on Return to the Continental United States from March to June 2003," *Journal American College of Surgeons*, Vol. 201, No. 1, July 2005.
4. D.L. Lin, K.L. Kirk, K.P. Murphy, K.A. McHale, and W.C. Doukas, "Orthopedic Injuries during Operation Enduring Freedom," *Military Medicine*, 169(10):807-9, 2004.

Section XII: Special Operations Medical Support to the Lebanon Civilian Evacuation Operation

SSG Imee S. Kiser

This section describes the sequence of events the Air Force Special Operations Command (AFSOC) encountered during the Lebanon civilian evacuation. Pre-mission operations included the initial notification of possible support requirements. The following two days were utilized for contingency planning, which included contingency response, base operations support, and evacuee support that included noncombatant evacuation operation (NEO) supplies. On the fourth day, the deployment order was issued. Some of the advantages with AFSOC are a small footprint, responsiveness, and the availability of a complete package. Disadvantages include the requirements for logistical support, limited resources, and short-term commitment.

Medical personnel support included two AFSOC flight surgeons, one Air Combat Command flight surgeon, two AFSOC independent duty medical technicians-paramedics, two AFSOC pararescue specialist-paramedics, and one AFSOC combat controller for manpower. The U.S. embassy also provided one physician and one nurse plus U.S. Navy physicians and corpsmen.

Medical support for the first 72 hours included meetings with U.S. Naval Command and Control node and host British military base officials in Cyprus. We also received U.S. Department of State support tasking upon arrival at ports. We were required to conduct split operations to support both seaport and airport locations. Our mission included medical evaluation and treatment of approximately 400 evacuees initially. Our continued efforts required planning and coordination for expeditionary medical support (EMEDS) arrival and numerous meetings with U.S. embassy officials. Our evacuees increased an additional 1,466 the first day, 1,044 evacuees the next day, and 800 evacuees the last day. On day three, the EMEDS advance element team arrived allowing a hand-off to EMEDS on day four. This provided the opportunity to transition to base medical support and a contingency response posture.

Categories of Patients

Pediatrics were predominantly children presenting with anxiety attacks, asthma, abdominal/gastrointestinal complaints, ear complaints, and upper respiratory infections. Forty-two percent of these patients were seen by EMEDS. Pregnant patients presented with abdominal pain/cramping, fatigue, and the possibility of more serious complaints later. General medicine patients presented with hypertension, heart disease, diabetes, asthma, anxiety, and urinary tract infections. Trauma was limited, but some recent vehicle accidents and extremity fractures were processed.

Medical skills included providers/practitioners associated with family/general practice, pediatrics, internal medicine, psychiatry, and psychology. Nursing and medical technicians provided general nursing care and pediatrics. Important medications included pediatric formulations, anti-hypertensives, antibiotics, insulin (glucometer), anti-diarrhea, pain relievers, eye and eardrops, and cough and cold medicines. Baby formulas, baby food, diapers, personal hygiene items, and any items specific to the culture must be considered.

Coordination

If you expect a joint effort, you have to look at medical resources of other militaries, HN civilians, NGOs, availability of hospitals, blood supply, ambulances, and pharmacies in the area.

Talk to the local government, public health officials, law enforcement, and address mortuary affairs issues.

Lessons Learned

Read Joint Publication 3-07.5, *Joint Tactics, Techniques, and Procedures for Noncombatant Evacuation Operations*. It provides an invaluable resource for how NEO is supposed to work, what medical complaints to expect, and which medications are needed. It also identifies public health and environmental issues and discusses mortuary affairs and personal hygiene supply concerns. Communications is vital and an important tool for mission success. Ensure internal communications capabilities are addressed. Look at possible solutions for the transportation of evacuees, support personnel, and medical personnel. Consider distinctive clothing or emblems, as uniforms may not be allowed. Public health education is necessary. Sanitation and hygiene facilities and supplies must be identified. Identify facilities for possible isolation of patients. Screen for possible communicable diseases to prevent further infection or major outbreaks.

Joint Task Force Lebanon's significant events included 15,000 evacuees supported, with 4,200 directly evaluated, and 70 directly treated. This was the largest noncombatant evacuation since the Korean War.

Section XIII: Role of Local National Medical Care in Special Operations Counterinsurgency Strategy

LTC Keenan and MSG Samuel Blazier

Field Manual 3-24, *Counterinsurgency*, is the current Army counterinsurgency (COIN) manual and defines insurgency as an organized movement aimed at the overthrow of a constituted government with subversion and armed conflict. COIN is defined as military, paramilitary, political, economic, psychological, and civic actions taken by a government to defeat insurgency.

The situation in Afghanistan during Operation Enduring Freedom IX in March 2007 included 17 firebases. This included 14 in the south and 3 in the west. The three fire bases in the west were more developed and had better infrastructure. They also had tertiary medical facilities available. The 14 firebases in the south were dominated by rural Pashtun villages. The majority were without local national (LN) medical facilities available or in close proximity.

Our strategy was to first conduct a medical assessment of the area of operation (AO). We then utilized the LN firebase clinics to provide non-threatening medical assets to augment the existing structure, to provide much-needed preventive or urgent care, and to gather intelligence by passive collection and through trust of LNs. The benefits included first-rate training and practice for medics and team training. It also served as a positive influence on the local populace and helped to gain their trust. The results were improved passive information gathering.

There are challenges for medical officers. The integration of strategy with coalition medical assets includes some “tough sells” specifically with head trauma and burns. The need for surgical and skilled nursing care is greatly enhanced, but you have very limited resources. You must develop clear guidelines for medics. Ensure you reiterate their scope of practice. Always provide oversight and guidance and be available by both phone and email. The standard of care is very different from the standard of care in the U.S., and practitioners must make that mental leap. They must think outside the box. Small things can help, but remember first do no harm and consider what type of care the patients would receive if they were dependent solely on a local provider.

Pre-mission medical training is essential. Focus on pediatrics, especially drugs and dosages. Burn care is necessary. Procedural sedation, especially the utilization of opiates (morphine and fentanyl), benzodiazepines (valium), and Ketamine, will also prove invaluable. Ketamine is safe, effective, and great for pediatrics.

Ensure the medics do an accurate area assessment that includes the local facilities and encompasses the team’s capabilities. Area assessments should determine the local medical capabilities and the availability of medical personnel. The assessment must address the host nation (HN) medical supplies and pharmacy services available. Consider the area assessment as a mini-medical civic action program. Assessments must establish both the clinic and security for the clinic. When establishing the clinic (or two), consider security and access. An inner clinic (American) and an outer clinic (LN) helps provide security for your team and provides an easier avenue for LN access. Use interpreters, look at special cases, and insure the medics stay within the parameters of their scope of practice. Interpreters provide the key to understanding cultural obstacles. Female interpreters are extremely valuable but very hard to find. You can also train them as medical assistants or medical transport drivers. Interpreters can be excellent judges of potential insurgents or questionable characters. On occasion, some may have former medical training.

Special cases normally include roughly 50 percent pediatric. Burns are very prominent at most firebases. Long-term care, chronic illnesses, and day to day treatments may require excessive medications and create problems for resupply. The operational expectations placed on special operations medics require a broad scope of practice. Medics must be cautious not to overstep their bounds in terms of scope of practice. The special operations medic will only provide care within his scope of practice, regulated by the battalion and group surgeons.

Section XIV: Medical Operations—Task Force 31
(Extract from Center for Army Lessons Learned, Counterinsurgency Handbook)

Evacuation and Hospitalization

Medical service organization and procedures must adapt to the type of operations envisioned. Medical support is complicated by:

- Distances between the installations where support must be provided.
- Use of small mobile units in independent or semi-independent combat operations in areas through which ground evacuation may be impossible or from which aerial evacuation of patients cannot be accomplished or will be significantly delayed.
- Vulnerability of ground evacuation routes to guerrilla ambush.

Several factors and measures may be used to overcome the complicating factors. The following are examples of such measures:

- Establish aid stations with a treatment and holding capacity at lower echelons, including static security posts and combat bases. Patients to be evacuated by ground transport may be held until movement by secure means is possible. Use forward-stationed surgical teams for area medical support of both U.S. and HN patients.
- Provide sufficient air or ground transportation to move medical elements rapidly to establish or reinforce existing treatment and holding installations where patients have been unexpectedly numerous (i.e., mass casualty situations).
- Maximize use of air evacuation, both casualty evacuation and medical evacuation, to include both scheduled and on-call evacuation support of static installations and combat elements in the field.
- Provide small medical elements to augment extended combat patrols.
- Assign specially trained enlisted medical personnel (special operations medical sergeants, independent duty corpsmen, etc.) who are capable of operating medical treatment facilities for short periods with a minimum of immediate supervision.
- Use HN medical assistance for supervised work and formation of indigenous litter bearer teams.
- Strictly supervise sanitation measures, maintenance of individual medical equipment (both individual first aid kits and combat lifesaver kits/vehicle kits), and TCCC training throughout the command.
- Increase emphasis on basic combat skills training of medical service personnel, arming medical service personnel, and using armored carriers for ground evacuation where feasible.
- Use indigenous medical resources and capabilities when available and professionally acceptable (not acceptable in current situation in Afghanistan).

- Establish medical clinics at each firebase. Establishing and running medical clinics at each firebase affords trauma-level treatment to stabilize wounded until medical evacuation can occur. Additionally, clinics can serve to assist the local populace in areas where there is no medical support or affordable care.

Local National Medical Care

We believe that the utilization of HN medical care and clinics are a valid and integral part of our nonlethal strategy of fighting a COIN operation. With our medical talents, each firebase utilizes medical care of local nationals to help achieve the overall goal of peace and stability in its respective AO. There are some key tenets and tasks that an individual medic should consider which are outlined below. We realize that individual experiences vary considerably, but given that we believe this strategy should be considered by any Operational Detachment-Alpha (ODA) wishing to make a significant impact on the local population while fighting counterinsurgency (COIN) operations, these principles can be applied piecemeal or in total.

In order to take advantage of this nonlethal experience, the individual special operations medic must consider establishing, operating, and managing a local medical clinic designed to address and/or augment medical care for the local populace. The rapport gained by providing a local medical clinic is forefront for SOF in their AO. Having rapport with the local populace has been a staple for Green Berets since their inception. Looking back on the stories of Vietnam and the “G-Hospitals,” a recurring theme is the provision of more sophisticated medical care to an under-served population.

The special operations medic should first assess the area to determine the local medical capabilities and availability of medical personnel—both HN and coalition assets. The assessment should include HN medical supplies and pharmacy services available. This availability will vary widely depending on the firebase location, but our experience in rural Afghanistan is the complete lack of some basic services and adequate medical supply. The special operations medic should establish and build rapport with the local medical personnel, and determine if they have the resources needed to carry out their responsibilities. There may be an opportunity to assist local clinics or hospitals by physically assisting and advising or with the procurement of local supplies and medications.

There are numerous “established” programs that a team may be able to utilize. Two that we have taken advantage of are the Commander’s Emergency Relief Program (CERP)—primarily civil affairs (CA) project funds or enabling earmarked HN funding to reach these remote projects and clinics (via the Afghan Ministry of Health). There may be national or regional programs that can be promoted by SOF in remote areas that are not being serviced as intended. Especially with a fledgling government in a primitive environment such as Afghanistan, outreach by the central governmental organizations may be sporadic to the rural areas. An example of this is the national vaccination programs which seeks to vaccinate all children in the country. Supporting and enabling the local medical clinic legitimizing the clinic and its personnel, which furthers the rapport process and benefits the ODA.

The ODA can conduct local “mini-MEDCAPs” to introduce the concept to the area and show support for the local populace. These visits are usually in conjunction with tactical operations into formally denied areas. As for medical care, it is far from definitive and should serve more as an advertisement for the firebase clinic or local national establishments. Remote towns may be unaware of these facilities until these planned encounters. Many medics carry small boxes or kit bags to take advantage of medical targets of opportunity while out on patrols. Medical interactions with the local populace are a very safe and valuable non-threatening encounter that

should be considered an augmentation to many tactical scenarios. These encounters can sometimes be planned in conjunction with tactical CA assessments and project nomination site surveys. The firebase medical clinic, however, is one of the key items in our COIN strategy.

Establishing and Running a Firebase Medical Clinic

Plan the location of a firebase local national clinic carefully. The special operations medic should establish a clinic in a safe area, and the clinic should be run purely by the team. An ideal location is outside the inner perimeter but still attached to the firebase. The firebase clinic should be accessible to indigenous personnel, yet have adequate security. Firebase clinics need a controlled access point, and the personnel entering the control point should be scanned with a metal detector or be searched physically by a HN soldier or security. This procedure is necessary to protect both the local civilians as well as the special operations ODA personnel. From this controlled access point, local nationals should go into a waiting area that is over-watched by HN soldiers or security personnel. This holding area provides an excellent opportunity for interaction with the waiting patients—whether it is for patient education, psychological operations presentations, or CA interaction. The clinic itself, however, is the main effort.

Many firebases choose to have the local national clinic (the outer clinic) and the “American” clinic (the inner clinic). The local national clinic is rudimentary, has basic exam tables and screening equipment, and the bulk of its medications can be local national medications supplied by CERP funding. The inner or “American” clinic contains the traditional Class VIII supplies, monitors, and everything needed for procedures and patients that are more complicated. A technique is to screen the vast majority of patients at the local national clinic and bring the sickest patients or those needing more advanced care to the inner clinic.

The special operations medic working in this clinical setting finds a tremendous opportunity to train ODA members, Afghan National Army medics, and interpreters to assist in medical procedures, taking vital signs, and the operational procedures of the clinic. This not only helps the medic with his daily duties but also provides vital hands-on training to first responders. Simple duties such as wound care and IV practice is a daily occurrence. This on-the-job training is a vital supplement to classroom or predeployment medical training for our own Soldiers. The confidence derived from this training pays enormous dividends during TCCC.

Scope of Practice

What we are seeing in these clinics is that the special operations medic has historically in operations and particularly in Afghanistan been the most medically qualified person in the majority of the remote AOs. With that fact in mind, several points come to mind.

First, medics must be cautious not to overstep their bounds in terms of scope of practice. It is important for special operations medics to remain within their medical training and comfort level and provide excellent care without getting in over their heads and incurring unnecessary scrutiny from the larger medical establishment. The operational expectations placed on special operations medics require a broad scope of practice; however, this should not be misconstrued as a license to practice freely. The mature medic understands his limitations and must know when he should pass a patient to a higher medical level. The special operations medic will only provide care within his scope of practice, ultimately regulated by the battalion and group surgeons. This level of trust and communication for consultations must be established early in the deployment and practiced regularly.

Medics must understand the medical operational environment. Each medic should be thoroughly familiar with both military and civilian evacuation chains, understanding that there may be a very non-permissive (military) or nonexistent (civilian) evacuation system in place. This is a continual problem that should be considered early in the treatment of medical problems. Medics will soon get an understanding of not only their capabilities but also the necessary limitations. There must be an appreciation for not “biting off more than they can chew.” After working in the environment, a medic quickly realizes there are some problems he should not address, especially chronic problems or problems so overwhelming that intervention will only delay inevitable deterioration or death. Every provider in this austere environment goes through a period of adjustment from the way he was taught to the way he will practice—effectively modifying the “standard of care.” A provider should always remember the axiom: “First, do no harm.”

Second, at times the special operations medic has so many people that come for treatment that he cannot physically screen, assess, and treat them all. The medics must develop a system to triage patients and refer to the local HN clinic as appropriate. This legitimizes the local clinic and local medical personnel, which serves to increase the rapport in the AO. It also dissuades the local populace from relying solely on the medical care provided by the “temporary” firebase and eroding the incentive for LN health care development.

Medical Supplies

The established local national clinic, as mandated by policy, should maximize the use of locally purchased medications. As discussed earlier, the CA and task force commander have access to CERP funding. This source of funding is specifically to be used on projects to bolster local economies and for projects designed to build civil infrastructure. The use of these funds is encouraged to purchase local national medications. This practice bolsters the economy, discourages an over-reliance on American products and medications, and legitimizes the local medications provided on the economy. Funding should be allocated early, and, in remote areas, medications and supplies can be purchased in larger cities (in our case, Kandahar) then shipped to remote firebases. We have found that a small amount of money goes a long way with supplying basic “snivel medications.”

Cultural Obstacles

In many cultures, there are significant cultural and religious prohibitions to males examining female patients. When a female was brought to a local clinic with a possible broken tibia/fibula, the special operations medic was not allowed to touch her, making it impossible to properly examine the patient. The medic was allowed only to place a splint over the clothing of the patient. Additionally, many females will not venture outside their homes or neighborhoods to even visit our clinics. Ideally, the busier clinics would benefit significantly by having female medics available to examine and treat female patients.

One of our firebases utilizes a female interpreter, and she works in the firebase clinic when missions allow. Her personality and intelligence allow her to function as a “medical provider” with guidance from the special operations medic at the clinic. We have found that a female face on the medical assessment overcomes most cultural impediments to accessing the patient population. Another of our clinics had a female treatment team visit from the local provincial reconstruction team, and the team's presence was widely advertised on the radio station run by our firebase. Even though the team was only there temporarily, it was enough to establish our clinic as a place that was culturally acceptable to treat female patients, and they continued to present for medical care long after the female team left.

Both of these clinics, which regularly continue to see female patients, have provided specifically for the privacy of the patients, establishing separate waiting areas, entrances and exits, and treatment areas designated for females. Once these cultural “precautions” are observed, a steady patient base seems to be established and maintained. In general, however, the cultural obstacles to seeing female patients are a continual limitation to our overall ability as a task force to reach the entire population and exploit this opportunity.

Patient Population and Treatment Challenges

Patient demographics are greater than 50 percent pediatric with many of those pediatric cases being less than two years of age. This necessitates Broselow Kits (or similar weight-based treatment aids), pediatric references, pediatric medications, and good lines of communications with pediatric and higher medical consultation.

Burns are a prominent injury at most firebases. The current evacuation environment restricts what burn patients will be accepted if coalition forces or the task force are not directly responsible for the injury. Standards of evacuation on the civilian side are not necessarily the same here. Each medic should be familiar with burn care and procedural sedation, since much of the wound care will necessarily be handled at the firebase clinic. Only those severe cases (30-40% body surface area burns and greater) are generally accepted for medical evacuation (MEDEVAC). In general, however, coalition assets are poorly equipped to handle burn cases and are very reluctant to offer higher medical treatment. In fact, burn injuries and closed head trauma are the most contentious cases when presented for MEDEVAC.

Medics should exercise caution in prescribing medications and treatment plans. Our experience shows that local national patients seldom take the medication as directed, may sell the medications you have given them, or may take dangerously large doses despite what you consider adequate education. In addition, follow-ups are sometimes nonexistent, so common treatments such as daily wound dressing changes actually become weekly. The medic should prepare for this contingency and modify his treatment plans to be even more fool-proof. Perhaps the KISS (keep it simple, stupid) principle should be foremost in every treatment and follow-up plan provided.

Common Mistakes Made in a Counterinsurgency Environment—TF 31

TF-31’s assessment of common mistakes made in COIN operations:

- Overly focused on attrition and quantifiable and/or quick success.
- Over use of U.S./coalition troops instead of HN forces to gain better tactical results, which undermines the HN forces and government. Tactical success at the cost of strategic failure.
- Multiple divergent lines of command and control all following separate agendas.
- Planning operations that are too large, too complex, too slow, and geared towards unrealistic results. The destruction of the insurgency once and for all.
- Conducting operations over too wide an area. For example: A search and attack with a battalion over a 20K area instead of 4K area. (sweep, clear, and leave incorrect method versus sweep, clear, hold, and develop correct method).

- Failure to focus combat forces through accurate intelligence.
- Failure to delegate authority to execute operations at the tactical command level resulting in a centralized decision-making process that is too slow to respond to time-sensitive information.
- Inability to trust or support lower level commanders to make important decisions at the tactical and operational levels.
- Over reliance on technology to compensate for lack of combat troops.
- Failure to reduce insurgent freedom of movement through other operations prior to launching offensive operations.
- Loss of surprise through operations security violations.
- Low morale of HN forces due to overuse in unfocused operations and as a result of the mismanagement or improper use of HN military versus HN police/civil defense forces.
- Failure to protect population centers prior to the start of offensive operations.
- Only focused on rural insurgent groups.
- Overly oppressive to the population.
- Failure to strike insurgent bases due to difficult terrain or bases that are located across international borders that the coalition forces are reluctant to cross. (Example: the USSR and the Afghan/Pakistan border in 1986.)
- Failure to establish an effective strategic, operational, and tactical information operations (IO) campaign to COIN IO efforts.
- Failure to recognize/COIN deception operations or insurgent influence on HN government and nongovernmental organizations that politically pits the HN government against U.S./coalition forces, causing unrealistic operational constraints to be placed on maneuver forces. (Example: Claims of rape/torture/targeting civilians/etc.)

Section XV: Special Operations Medicine in Counterinsurgency Operations

LTC Sean Keenan

A panel moderated by LTC Sean Keenan was convened of select individuals with a variety of recent deployments, different missions (MEDCAPS, humanitarian assistance, preventive medicine, foreign internal defense [FID] of HN forces, passive intelligence gathering), and various background within the special operations community to discuss counterinsurgency operations (COIN). Each panelist provided a short presentation of his or her individual experience. The “hot topics” identified by the majority of the panel were MEDCAPs, surgical support, necessity of medical missions, and new country mission planning.

The current Field Manual 3-24, *Counterinsurgency*, defines insurgency as an organized movement aimed at the overthrow of a constituted government with subversion and armed conflict. COIN is defined as military, paramilitary, political, economic, psychological, and civic actions taken by a government to defeat insurgency. The field manual interim (FMI) 3-07.22, *Counterinsurgency Operations*, which expired in October 2006, contained one page on “health considerations.” The current manual contains almost no mention of medical considerations. Center for Army Lessons Learned's (CALL) Task Force 31 handbook on southern and western Afghanistan, dated January 2007, contained six pages on medical. The FMI stated on page 1, “Appropriate and limited medical attention may be applied to indigenous populations at the discretion of the commander and proper military medical authority. This care may be appropriate where the level of local civilian medical care is limited or nonexistent. Limited medical assistance may enhance the acceptance of multinational personnel within the local population.”

Under the COIN umbrella, SOF have conducted missions to foster local security in the immediate area of operations and established local national (LN) clinics as “service” to communities, which provides a means of passive intelligence gathering. MEDCAPs also are conducted under the COIN umbrella that supports theater/strategic goals. Humanitarian assistance missions provide support to displaced populations. COIN provides a means to augment public health and LN medical providers by promoting preventive medicine programs and training civilians. We are able to continue FID missions by conducting medical training of HN forces.

SOF are ideally suited to operate in austere environments with little support. Out training provides a higher degree of situational awareness and cultural familiarity coupled with inherent security to go to “semi-permissive” areas. Our medical providers are very advanced and organic to the unit. Problems that exist include limited weight and cube for medical missions, no true surgical support, and a very limited support structure. Surgical support always has to be considered for force protection, but availability of LN care or liaison support may not be readily available. Should medical considerations be up front (besides force protection) when considering COIN mission or should the civil affairs units (or other organizations) assume these missions? If you are the medical planner working within the task force cell planning a new COIN mission in a new country, how do you plan?

The experienced provider...will have to participate in only a few MEDCAPs—no matter how large the package and how specialized the providers—to appreciate the relative futility of showing up in town one time and providing care. A much more effective strategy is to identify areas that are truly under served and provide basic services there on a more regular basis...

—LTC Sean Keenan, *Special Warfare Article/JSOM Article*

Chapter 6

Female Treatment Team After Action Review: Combined Joint Special Operations Task Force-Afghanistan (CJSOTF-A), Task Force (TF)–71

MAJ Stacy Usher Weina

Female Treatment Team (FTT) After-Action Review (AAR)

The FTT is key to the success of the 7th Special Forces Group (SFG) mission of seeing a population that is neglected medical care. The FTT member must be flexible, mature, experienced, and a team player.

Observation

Section 1: Environmental health factors

Environmental health factors posing the greatest risk to forces deployed to Afghanistan include: (Note: No specific environmental study has been conducted for Afghanistan. Therefore, there is a lack of information on the quality of the air, water, vegetation, land.)

- High altitude: No altitude sickness cases were reported. Forces acclimated to the higher altitude in a few weeks.
- Temperature extremes: The summers in Uruzgan where my clinic was located are not as hot as other provinces. The winters tend to be colder than most areas.
- Dust and dirt pollution, no smog due to lack of industry
- Land mines: Worst environmental problem because of constant war: 10 million in country; 20 deaths per day

Section 2: Team and coalition health issues

Nutrition:

- Lack of fresh fruit and vegetables resulted in vitamin deficiencies. Many team members took daily multivitamins.
- Food and water infections in travelers: E-coli, shigellosis, giardiasis, cryptosporidiosis, noroviruses, and Hepatitis A.
- Undercooked meat and cooked food allowed to stand for several hours can carry several intestinal pathogens.

Exercise:

- Sports: Sprained or twisted ankles were seen from basketball or running on the rocky track.
- Weight training: Strains of various muscles from weight training.

Altitude sickness:

- Rare, but it is a possibility traveling from sea level to the elevation of some of the firebases.
- Reactive airway disease (RAD): Due to the dry air and altitude, those individuals with a history of RAD will have an exacerbation while here and will need to bring their allergy medications, Albuterol inhalers, and other medications.

Chronic pain: Patients with chronic pain issues were able to get Celebrex and Mobic through the TF-71 medical supply.

Immunizations: Centers for Disease Control (CDC) recommends influenza, varicella, polio, mumps-measles-rubella, diphtheria-polio-tetanus, Hepatitis A, B, and typhoid. U.S. Army mandates smallpox and anthrax immunizations at this time.

Malaria: CDC recommends taking mefloquine, doxycycline, or atovaquone/proquanil while in Afghanistan. Primaquine is recommended only in special circumstances and only after G6PD testing. Chloroquine is not used in Afghanistan due to resistance. Treatment of clothes and bedding with permethrin is recommended.

Tuberculosis: Some Soldiers had a positive PPD reading and started INH while deployed.

Hygiene: The area is very dirty and dusty. Recommend bring antibacterial hand wipes or alcohol based hand sanitizer containing at least 60% alcohol.

Section 3: Local national health issues

Local national health issues include the following:

- Dehydration: Signs and symptoms include headaches, lightheadedness, dizziness, weakness, body aches, visual disturbances, and mood disturbances.
- Poor diet: Signs and symptoms include abdominal pain, weakness, malnutrition, anemia, lightheadedness. Twenty-five percent of children die before their fifth birthday, half of children under five years of age are stunted in growth, and 10 percent have acute malnutrition.
- Hygiene: Signs and symptoms include fungal and bacterial skin infections, cysts, abscesses, dry skin with cracking.
- Injuries: Burns, motor vehicle accidents, broken limbs, gunshot wounds, lacerations, shrapnel wounds: Burns are very common in Afghanistan. The children either accidentally fall into the fire pit of the home or are abused using fire. Home remedies that may be harmful are applying purple ink or toothpaste to the burns. In addition, the local Afghans will burn another part of the body to distract from the pain as a burn treatment.
- Substance abuse: Alcohol and marijuana. These substances affects how much pain medication and conscious sedation medication the medical provider should administer.
- Infectious diseases and immunizations: tuberculosis (TB), malaria, polio

- TB: 15,000 deaths/year (12,000–13,000 are women)
- Measles: 35,000 cases per year
- Polio: 11 cases in 2001, 120 in 2000
- Malaria: 2–3 million per year, 6 percent falciparum
- Mental health: 30–50 percent of the population has some sort of mental illness due to the violent conflict in the country
- Life expectancy: 45 years for men, 47 years for women

Section 4: Local medical personnel

Local medical care challenges include the following:

- Health system is one of the poorest in the world. Six million people have no or insufficient access to health care.
- Local pharmacists will diagnose and prescribe medication without any formal education.
- Most local doctors have fled the local areas due to the threats from the Taliban.

Section 5: Patient care

I worked at a clinic at a firebase that averaged 15–30 patients per day. The local national patients were seen on Mondays, Tuesdays, and Wednesdays. The local workers were seen on Thursdays. The Abu Sayyaf Group (ASG) and Afghan National Army (ANA) were seen on Fridays. The type of patients ranged from the common cold to microvillous atrophy.

Between 40–670 patients were seen during medical civic action programs (MEDCAPs). MEDCAPs:

- Sangin 1:
 - Gastroesophageal reflux disease (GERD),
 - Upper respiratory infection (URI)
 - Headaches
 - Malnutrition
 - Body aches
 - Fungal skin infections
 - External otitis
 - Dry skin

- Hunger pains
- Sangin 2:
 - Seasonal allergic rhinitis (SAR)
 - Cough
 - URI
 - Stomach pain
 - Diarrhea
 - GERD
 - Back pain
 - Eye irritation
 - Dizziness
 - Poor hygiene
 - Dry skin
 - Cavities
- Maruf:
 - Malnutrition
 - Poor hygiene
 - Dry skin
 - Cataracts
 - Dry eyes
 - Cavities
 - abdominal pain
 - Diarrhea
 - Dehydration
- ANA:
 - Abdominal pain

- Cerumen impaction
- RAD
- Flat warts
- URI
- Headaches
- Back pain
- Zabul:
 - Failure to thrive
 - Headaches
 - Dizziness
 - URI
 - Cavities
 - Abdominal pain
 - SAR
 - Body aches
 - Skin Infections
- 82nd:
 - Cerumen Impaction
 - Fungal skin infection
 - Flat Warts
 - Lightheadedness
 - Headaches
 - Diarrhea
 - Abdominal pain
 - Dry skin

- Spin B:
 - Kwashiorkor Syndrome
 - Dehydration
 - GERD
 - Headaches
 - Body aches
 - Skin abscess
 - Dry skin
 - Cavities
- Sangin 3 (MEDCAP and VETCAP)
 - GERD
 - Headaches
 - Dehydration
 - Dry skin
 - Cavities
 - Body aches
 - 2 traumas from shrapnel
 - Poor hygiene.

Section 6: Healthcare facilities

I worked at firebase fixed site medical clinic. This stand-alone clinic is more than adequate. It has air conditioning, tile floors, and painted cement walls.

Most MEDCAP missions used a fixed facility. The teams would reconnoiter an area appropriate to see a large number of patients. The flow of patients and security were the two most important considerations in choosing a site. The buildings were dirty with poor airflow.

Section 7: Medical providers

There was an adequate number of providers at the firebase clinic until the end of the deployment. The team had at least one 18D, Special Forces Medical Sergeant to man the clinic. A female provider from the FTT was assigned to the clinic for July, August, and September 2007.

The number of providers varied for each MEDCAP mission. There was always one female provider to see the female patients. If there were no female patients, the female provider would care for the children and men. There was usually a male physician's assistant (PA) or medical doctor. The team sponsoring the MEDCAP would offer the team 18D to help. The group dentist and veterinarian would attend some MEDCAP missions.

Section 8: Interpreters

The assigned interpreter to the firebase clinic is a hard working, competent interpreter.

The interpreters used for MEDCAPs were Category I interpreters. The interpreters were different for each MEDCAP mission. The speaking ability varied from fair to excellent.

Section 9: Transportation

There is no front-line ambulance for the firebase. Air assets were used for emergency evacuations. The local population has no local ambulance.

Transportation to the MEDCAP site was via military convoy. Transportation to the firebase MEDCAP mission was via military aircraft.

Section 10: Schedules

The firebase medical clinic has posted hours. Mondays, Tuesdays, and Wednesdays are for local national medical care. Thursdays are for the local camp workers. Fridays are for ANA and ASG patients. Patients are let through the gate from 1000-1200.

Most MEDCAPs were held Monday through Friday. We would fly in on day one, provide the MEDCAP for three days, and then travel home on day four. We preferred to have the MEDCAP start early and end in the early afternoon to avoid having patients travel in the heat.

Section 11: Supplies

The Class VIII and medications at the firebase clinic for the local national and coalition forces were adequate. There was no hand washing station or sterilizer. Civil affairs left plenty of local medications, backpacks, and hygiene items. Class VIII for the Soldiers was ordered through Kandahar Airfield TF-71 medical logistics officer and arrived weekly on the ring flight.

The medications, soap, shampoo, toothbrushes for the MEDCAP were supplied by the civil affairs office at TF 71. The order was put in with plenty of time prior to the MEDCAP. They were packed in pelican cases and arranged on pallets for the flight.

Section 12: Security

Firebase clinic security is provided by ASG. There are two keys to the clinic. The 18Ds are the only ones with the keys. There is a combination lock for the medication room. There is another lock for the narcotic cabinet.

Inner perimeter security was provided by the team that requested the MEDCAP. The outer perimeter security was provided by the ASG or ANA, depending on what assets that team had. Each team worked closely with coalition and other U.S. units who also provided help with security.

Section 13: Communication

There is no telephone, Internet, or radio in the firebase clinic.

Communication was available between the SFG team members. There was no communication radio between the MEDCAP team members.

Section 14: Operations

The 18D at the firebase clinic provides patient care to the team, enablers, and all camp staff. He had a supply of medications and class VIII is his room in case of emergency on camp where the patients live. The 18D traveled with his aide bag and had an emergency mass casualty (MASCAL) bag in the ground mobility vehicle (GMV) as well.

The MEDCAP was requested by special operations forces through the surgeon's office. There is a MEDCAP standing operating procedure (SOP) located in TF-71 office to follow in order to assure getting equipment, interpreters, medications, personnel, and air.

Section 15: Training

Three nurse practitioners (NPs) attended the Special Operations Combat Medic Skills Sustainment Course (SOCMSSC). Two of the NPs and one medic attended CONUS Replacement Center (CRC) training at Fort Benning, GA. The CJSOTF-A surgeon office provided a briefing. The dentist and physical therapist provided training at Fort Bragg, N.C. and in Afghanistan.

Section 16: Nurse practitioner and medic requirements

Family NP, board certified, team player, and positive disposition was recommended to the FNP consultant. Army Medical Department (AMEDD) was given similar requirements for the female medic.

Section 17: Personal Equipment

Medical supplies for the mission were supplied by 7th SFG medical logistics. The military equipment and uniforms were supplied by CRC RFI and Fort Benning/Fort Bragg RFI. A packing list was provided by 7th SFG noncommissioned officer in charge and headquarters and headquarters company. (See predeployment AAR.)

Discussion

Patients

Firebase clinic: Common complaints of the local national patients were headache, dehydration, fatigue, abdominal discomfort, body aches, eczema, and toothaches. Men, older women, and children of all ages were seen. The average load was 15 patients per day. The coalition forces complaints varied from headaches, sleep disturbances, muscular pain to shrapnel wounds. There was no fixed sick call for U.S. forces due to the operations tempo and different schedules. Patients would catch the 18D when they could to ask for medical care. The clinic patients' name, diagnosis, age, and village are written down and stored in the clinic. The U.S. and coalition forces seen were recorded for the situation report (SITREP), but SF 600s are written on them.

MEDCAP: Common complaints from the local national patients were GERD, URI, headaches, malnutrition, body aches, fungal and bacterial skin infections, external otitis, dry skin, hunger pains, SAR, cough, URI, stomach pain, diarrhea, back pain, eye irritation, dizziness, poor hygiene, cavities, dry skin, cataracts, dry eyes, dehydration, cerumen impaction, RAD, flat warts, failure to thrive.

Facility

Firestore clinic: The medical clinic is a fixed facility with electricity and air conditioning. There are four trauma rooms of adequate size for the providers to use. There are shelves to display medication and supplies necessary for treatment. The beds are litters. There is a north and south entrance. The local national patients enter through the south door after being escorted from the gate. There is a light in each trauma bay; however, it is dull. We used a desk lamp to shed more light for dental cases and suturing.

MEDCAP: The site used for the MEDCAP was chosen prior to the MEDCAP team arrival by the team who requested the MEDCAP. The facility was visited by the MEDCAP team and 7th SFG team to plan patient flow, security, equipment issues, and transportation. A fixed facility was preferred. Separate areas for men and women patients were necessary. Chairs, litters, tarps, 550 cord, tape, sharpies, six pelican cases with medications, and other supplies would have to fit into the building.

Providers

Firestore clinic: There were two 18Ds assigned to the team. However, one had to take over a different position in the unit, which meant he was available mostly for emergencies. Therefore, medical coverage was adequate between the two of them. The FTT member would cover the clinic alone when the 18D went on missions.

MEDCAP: The FTT for a MEDCAP consisted of one NP and one medic. This was preferred; however, some missions required more females, which were loaned from TF MED. Other providers that would sometimes attend the MEDCAP were physicians, physician assistants, the group dentist, the group veterinarian, and the group physical therapist. Some MEDCAP missions were run with coalition forces and their medical personnel.

Interpreters

Firestore clinic: There is one interpreter for the clinic. He is a hard worker who has a good medical knowledge and speaks English well. He takes the initiative to have the clinic cleaned everyday at 1500. He goes to the civil affairs CONEX to stock the clinic with clothes, medications, formula, and hygiene items for the local patients. He is an excellent assistant during procedures.

MEDCAP: The interpreters were requested by the TF-71 PA with at least 72-hour notice. It was a different group of young men each time. The English language skills varied from poor to excellent. The mission cannot be done without these interpreters. When caring for female patients the interpreters would stand to the side to provide privacy for the female. We did have one Category II interpreter for several of the missions, which did not work out as well as the Category I local national male interpreters.

Transportation

Firebase clinic: Local patients are transported to the clinic via car, ANA vehicle, or wheel barrel. There was no local emergency vehicle. There was no front line ambulance (FLA) for the 18D to use during convoys. There was discussion of gutting the green GMV to allow for patient transport lying down.

MEDCAP: Transportation to the firebase was via helicopter. The request for air was done well in advance and the missions were pushed to the right quite frequently. Transportation to the MEDCAP site was via military convoy when not performed at the firebase.

Schedule

Firebase clinic: The 1000-1200 daily schedules worked well. Local national patients would still come for care on Thursday and Friday. They were not turned away. ASG and ANA would be put at the end of the line if they arrived on any day but Friday. Emergencies would arrive at any time to be seen. ASG would call the medical interpreter on the radio. He would then locate the 18D or FTT member and meet the patient at the clinic.

MEDCAP: Most missions started early in the morning and ended in the early afternoon. This worked out well when considering the heat of the day. We would work for three days, sometimes varying the location of the sites.

Supplies

Firebase clinic: Local national patients used plenty of lotions, soap, toothbrushes, toothpaste, shampoo, formula, and medications. Civil affairs was not here, but they left plenty of humanitarian assistance materials and hygiene supplies to continuously stock the clinic. Common medications used by the local patients: Tylenol, Motrin, Zantac, Keflex, Augmentin, eyedrops, Bengay, multivitamins and oral rehydration salts. They went through a lot of suture material and bandages for wound care. The U.S. and coalition forces used a lot of Motrin, eye drops, toradol, Benadryl, Sudafed, Claritin, Albuterol, Advair, Mobic, and robaxin. This was ordered through the TF-71 MEDLOG officer.

MEDCAP: See Annex A for typical supply request list ordered from the civil affairs office. Sick call type medications and preventive medicine supplies were very common to administer to patients. Teaching on subjects such as personal hygiene and mouth care were given at each MEDCAP. Other supplies brought to the MEDCAP were wound care kits, gloves, endotracheal tube kits, tarps, litters, hand sanitizer, and aide bags.

Security

Firebase clinic: ASG provides security for the camp and the clinic. They are responsible for searching the patients prior to entering the clinic.

MEDCAP: There were two perimeters for security. The team that requested the MEDCAP would orchestrate the security with the assistance of coalition forces, other conventional US forces, ANA, ASG, and other enablers able to assist.

Communication

Firebase clinic: It would be helpful to have the ability to telephone the battalion surgeon and PA for medical advice from the clinic. The Internet would be useful for research; patient charting in Medical Command, Control, and Communications; and immunization tracking in the Medical Protection System. A built in radio to communicate to the clinic from the operations center (OPCEN) and vice versa would be useful in emergencies and routine issues.

MEDCAP: Hand held radios were used at one MEDCAP site, which seemed to work well. When there were no radios, it was difficult to communicate with the other providers and the security forces. Some missions required the female providers to search the female patients. We would rotate this mission and a radio for communication would have been helpful.

Operations

Firebase clinic: The firebase clinic was run by the 18D. The FTT member would help run the clinic and perform sick call alone when the 18D was out on a mission. The local national interpreter was always easy to get a hold of for sick call hours and for emergencies.

MEDCAP: TF-71 ran a smooth MEDCAP at every mission requested. The PA and MD in charge were proficient at requesting personnel, supplies and air. They were flexible and easy to work with. The FTT medic and TF-71 medical team wrote a SOP for MEDCAP missions for future operations, which is maintained in the clinic at Kandahar Airfield.

Training

The two week 18D refresher course SOCMSSC was attended by the three NPs. Two of the NPs and one medic attended CRC at Fort Benning, GA. CRC was for six days. The Soldiers had the opportunity to qualify. They received classes on first aid, IEDs, rules of engagement, and several other predeployment classes at CRC. CJSOTF-A surgeon office briefing was provided by CPT Storey to all six FTT members. The dentist and physical therapist provided training at Fort Bragg, N.C. and in Afghanistan.

Nurse practitioner and medic requirements

It is recommended that the NP and medic be flexible, hard working, innovative, athletic, and experienced in her field. It is recommended that the NP have several years of experience in leadership and clinical, but she is able to take orders from and recommendations from persons of lower rank. It is recommended that the medic is at least an E6 with a history of responsibility and leadership.

Personal equipment

Some of the FTT received military equipment from CRC RFI. They needed a letter from the 7th SFG commander to refuse CIF equipment from Fort Benning and received CIF at Fort Bragg instead. The FTT receiving more RFI at Fort Bragg with 7th SFG. The FTT turned in the CIF and RFI equipment to the Fort Bragg CIF prior to returning home. Some Soldiers sent equipment home and turned the CIF equipment at their duty station.

Lesson Learned

Patients

Firestore clinic: Two hours per day is enough time to let in several patients. If the time were extended, local patients would show up all day looking for medical care and medication. The patients also came in for food or money. The local clinic has been closed down by the Taliban and the local population does not have a local provider. The one provider in town is a pharmacist who does not understand path physiology. No young women of childbearing age came to the clinic unless in emergencies. The clinic would have to be closed when the 18D had missions. Some days several U.S. patients are seen and they are recorded in the SITREP.

MEDCAP: Most MEDCAP missions had the same type of patients despite traveling in several different regions. The patients were not receptive to some teachings that went against customs. They did not believe that lack of water intake was the cause of most of their medical problems.

Facility

Firestore clinic: The doors must be locked at all times since you cannot see someone entering the north entrance when working clinic in the rear of the facility. The medication room needs to be locked at all times. It has U.S. medications on the east side and local medications on the west side of the room. Light is sometimes too dull when doing procedures.

MEDCAP: The facility varied with every MEDCAP mission. We were lucky when we worked in a facility with airflow and cleanliness. We were prepared to work outside in the hot sun or inside a hot, smelly mud hut.

Providers

Firestore clinic: 18Ds have to go on missions which means the clinic is closed. This has a negative effect on the relationship with the local population who sometimes travel several miles to seek care.

MEDCAP: There was usually an adequate number of providers for each MEDCAP. Having a female provider at each MEDCAP was helpful since the women in most villages would not be seen by a male provider as part of their custom.

Interpreters

Firestore clinic: The interpreter at my clinic is an excellent interpreter for this job. However, when he went on vacation for a month, it was difficult finding someone to replace him.

MEDCAP: It is essential to brief the interpreters on the rules and medical terminology prior to each MEDCAP. They would receive a briefing by the PA prior to departure. We learned to consider their prayer rituals into the mission as well.

Transportation

Firestore clinic: A gutted GMV/heavy military vehicle would have been useful during several missions when Soldiers were wounded. Patients always seem to manage some kind of transportation to the clinic for transporting an emergency patient.

MEDCAP: The air transportation to the MEDCAP was unreliable. We learned to be flexible with the MEDCAP schedule because of this. The FTT members learned how to be part of the convoy operations to and from the MEDCAP sites.

Schedule

Firestore clinic: The pattern in this area is for the local people to come to the base for any medical emergency and at 1000 on Monday, Tuesday, or Wednesday for sick call. They will come for something as simple as body aches to more complicated cases such as gunshot wounds. ANA will occasionally state an emergency in order to be seen for a routine problem.

MEDCAP: Each MEDCAP schedule varied from how long the team needed us there.

Supplies

Firestore clinic: We frequently ran out of multivitamins, anti-inflammatory, eye drops, space blankets, and tourniquets. The ANA medics did not have adequate aid bags, which resulted in our helping them with supplies and education.

MEDCAP: We would run out of the medications on the final day and usually at the final hour of the mission. The sick call medications and personal hygiene items would run out first. We learned how to adjust the order according to the most prevalent diagnoses.

Security

Firestore clinic: The ASG would not search some of the patients as well as others based on looks and ethnicity.

MEDCAP: The team that requested the MEDCAP provided adequate security for the missions. However, the MEDCAP personnel had to advise the team on inner perimeter security at times having to do with patient flow and ANA personnel.

Communication

Firestore clinic: The 18D had to call the battalion surgeon from the OPCEN in order to get a second opinion. Research on patients was done via book or Internet at night. All-terrain vehicles were used for communication with the OPCEN, but the 18D or the interpreter had to leave the clinic.

MEDCAP: Hand-held radios were useful for communication between MEDCAP team members.

Operations

Firestore clinic: The 18D runs the medical operations and clinic on base. However, he has many other military duties that keep him busy and sometimes pulls him away from the clinic. Having a FTT member run the clinic when he is gone is helpful for the mission. In addition, having Class VIII supplies and medications near OPCEN is essential. MASCAL aid bag would be helpful when going on missions.

MEDCAP: Communication with the team prior to departure is essential. The PA would verify the CONOP prior to departure. Confirming with rotary air and the interpreter POC was key to a

successful mission. Ordering supplies well in advance for future MEDCAP missions worked well.

Training

CRC at Fort Benning was essential for those members of the FTT who had never deployed to Afghanistan. SOCMSSC was an excellent experience to see what the 18D is capable and where they are coming from when providing care. The CJSOTF-A briefing from the surgeon's office and the 7th SFG HHC was helpful. Training by the dentist and PT from 7th SFG was educational.

Female treatment team requirements

The three NPs and three medics chosen for the mission worked well for the missions assigned to them. One medic did not work out for the mission whom we attribute to lack of maturity and experience.

Personal equipment

The FTT will need the letter refusing CIF prior to departing for CRC. Traveling back from Fort Benning was difficult with all the equipment issued at RFI- 2 duffle bags. Medical logistics issued Contico boxes to help travel to and from Afghanistan. Medical supplies were issued in Afghanistan.

Recommended Actions

Patients

Firebase clinic: Have a provider to cover the clinic at all times. This will help keep the positive rapport the firebase has with the local population. A FTT member would work well since they do not go out on missions. Once the area is more secure, consider training the local nurses and doctors in providing medical care. Civil affairs presence would be useful. Consider tracking the U.S. patients' care with Excel spreadsheets and maintaining copies of their SF 600s. This may be difficult with enabler units such as the Reserve Soldiers.

MEDCAP: See the annex for the medications ordered which will be necessary for the common diagnosis treated. See the women one at a time since they tend to want whatever medication and supplies you gave to the other women. Read up on leishmaniasis, TB, malaria, and polio. Write down any patients' names for whom you think the CJSOTF-A surgeon's office can arrange a simple surgery, for cases such as hernia repair.

Facility

Firebase clinic: Bring a procedure light for the dental and other procedures. Add shelves for the hallway for the CA items. Purchase plastic drawers for the trauma bays.

MEDCAP: Bring your headlamp for the dark rooms used. Pack tarps to separate the room into patient bays. Try to use fixed facilities with separate areas for men and women and separate entrance and exit as well.

Providers

Firestore clinic: Two 18Ds would be useful if possible, provided they do not have another role. FTT members can man the clinic alone when the 18Ds go out on missions.

MEDCAP: Try to send at least one FTT member to each MEDCAP. It is recommended that she have another female provider and a female to provide searching as well.

Interpreters

Firestore clinic: Continue having one interpreter as the clinic interpreter for continuity.

MEDCAP: Continuing briefing the interpreters on their role, rules, requirements, helicopter safety, medical terms, and packing list.

Transportation

Firestore clinic: Consider bring a FLA for the next deployment. Alternatively, gut out the green GMV for carrying patients on litters.

MEDCAP: Continue putting in air asset requests early. FTT members need to be familiar with helicopter safety and convoy operations.

Schedule

Firestore clinic: Continue with the current schedule at the clinic to provide continuity and maintain a good report with the population. Stick to the schedule as much as possible to prevent patients from taking advantage of the health care provider's kindness.

MEDCAP: Having the MEDCAP at the same site for more than two days is not recommended. Starting early in the morning to avoid extreme heat is also recommended.

Supplies

Firestore clinic: Stock up on sick call medications when first arrive in country. Bring all dental and procedure tack sets. Bring a sterilizer for all the instruments used for the several procedures. Continue supplying and training ANA medics in TCCC concepts.

MEDCAP: Order medications and supplies several weeks prior to the MEDCAP. Bring a back up chest of medications, vitamins, and personal hygiene items.

Security

Continue current security plan with close coordination between the 7th SFG team and MEDCAP team.

Communication

Firestore clinic: Install Internet, telephone, and radio in the medical clinic.

MEDCAP: When on MEDCAP missions, provide radios to all the providers to communicate with the teams and other providers.

Operations

Firebase clinic: Clinic operations ran smoothly despite being in an austere environment. Continue charting on SF 600 for coalition forces and give the Reservist patients the original copies. Continue storing sick call supplies near OPCEN as well as the clinic for convenience. Bring MASCAL aid bag on missions to care for several patients at once.

MEDCAP: If one follows the SOP written by SFC Phillips and the TF-71 medical team, a successful MEDCAP will occur.

Training

It is recommended that the FTT attend CRC, SOCMSSC, and the CJSOTF medical training.

Requirements

After screening the records, interview each Soldier in person or via video teleconference. Maintain the requirements for a flexible, athletic, competent leader who is willing to take orders from persons of lower rank.

Personal equipment

Continue refusing CIF at Fort Benning and receive CIF at Fort Bragg. Go to both Fort Bragg and Fort Benning RFI. Bring only minimal medical equipment to Afghanistan, it will be issued to you once in country. Do not bring any unnecessary equipment: rain gear, cold weather boots, etc. Follow the packing list given to you by HHC. When traveling to other firebases you may have to leave other equipment behind at Bagram Airfield or KAF.

Typical Order for a MEDCAP Mission

Items	Quantity
Tylenol 325mg tablets	2000 tabs
Mebenzazole 100mg tablets	1000 tabs
Ibuprofen tablets 400mg	1000 tabs
Albuterol inhalers	10
Doxycycline 100mg	500 tabs
Acetaminophen syrup 160mg/ml	40 bottles
Acetaminophen infant drops 80mg/.08	40 bottles
Adult multivitamins/vitamins	3000 tabs
Childrens' chewable vitamins	2000 tabs
Guafenesin 600mg PO tablets for cough	500 tabs
Gentamycin eardrops	20 bottles
Loratidine (Claritin)	200 tabs
Debrox eardrops/Carbamide Peroxide	10 bottles

Cortisporin Otic drops	2 boxes
Cepacol throat lozenges/Benzocaine/Menthol	20 bottles
Bacitracin ointment	50 tubes
Guafenesin 600mg/Robatussin syrup	50 bottles
Hydrocortisone 1% cream	50 tubes
Clotrimazole 1% cream or Lamisil cream	50 tubes
Ranitidine 150mg	1000 tabs
Maalox tabs or Pepto for upset stomach	500 tabs
Lopressor blood pressure medication (50mg)	300 tabs
Children liquid multivitamin	50 bottles
HCTZ 25mg	300 tabs
Pyrantel Pamoate	10 bottles
Eye refresh drops for dry eyes	50 bottles
Azithromycin antibiotic tablet	200 tabs
Guafinesin Syrup 4oz bottles	50 bottles
Amoxicillin 250 mg antibiotic tablets	200 tabs
Keflex 250mg tablets	200 tabs
Antibiotic eye drops	20 bottles

Table 6-1

Note: Separate order for toothbrushes, toothpaste, soap, shampoo, Pedialyte, lotion

Chapter 7

Marine Corps Lessons Learned—Operation Iraqi Freedom (OIF) 06-08

Topic: Lioness Program (Women in Combat)

Observations

As the officer in charge for the Lioness Program under Regimental Combat Team (RCT) 2, I was directly responsible along with my training cadre for ensuring that these warriors met the requirements as put forth by the commanding general of Multi-National Force-West. The toughest challenge was mentally preparing these warriors to deploy into the area of operations alongside the infantry battalions when most had never left the perimeter of their base camp.

Discussion

The training package conducted at the RCT and subsequent training within the units they are attached to proved beyond a doubt that these women were ready, willing, and able to perform in a combat situation. These women were eager to learn and wanted to play a more significant role in the security and stabilization of the operational environment to which they were assigned. While not directly involved in offensive operations, their mere presence on the front lines alongside their male counterparts served as a deterrent to insurgents attempting to gain entrance with explosives and improvised explosive device (IED)-making materials.

Recommendation

The Lioness Program will need to expand to include Iraqi women partnered with our women warriors. This would be a vital link between the community and Iraqi police that would deal a severe blow to the insurgency. Having the locals contribute to the safety of their own ensures that we are moving forward within the community. Our women warriors go through the same classes as the males during their pre-deployment training, so that training should be used to our advantage.

Implications

If the program is not expanded, the insurgents will undoubtedly find that at some moments we are vulnerable due to the lack of personnel. To remain vigilant requires that we have the resources and manpower to sustain our security posture. Without resources, the number of attacks against coalition forces as well as the local populace will not decrease, and it will take longer to achieve the desired results.

Event description

Improvements in training (language, cultural, live fire exercises and IED lanes) occurred each month as the program expanded to include additional women warriors. The enthusiasm of the warriors led to volunteers coming back for second and third tours in a combat environment. They understood the significance of what they were accomplishing and how it contributed to the overall success of the mission.

Topic: Predeployment medical readiness

Observations

Units are deploying with Marines and Sailors who are not fit for full duty or deployment. This is due to incomplete predeployment medical readiness evaluations and, often, the individual servicemember's desire to deploy. Many of these servicemembers are subsequently redeployed due to disease and non-battle injuries (DNBIs), and replacements are not readily available. They place missions and other servicemembers at risk and are an additional burden on in-theater medical assets and medical evacuation capabilities.

Discussion

Medical readiness has many aspects. It encompasses immunizations, prescription eyewear, dental care, mental health, and physical ability. The high visibility tracking issues of immunizations and dental care are rarely an issue once deployed, but Marines and Sailors with chronic medical conditions often have significant difficulties when deployed. The most common issues are orthopedic in nature (back pain, shoulders, knees, and ankles), but any medical condition causes some degree of difficulty in garrison will inevitably worsen once deployed. Likewise, mental health issues of anxiety, post-traumatic stress disorder (PTSD), depression, post-traumatic brain injury syndromes, and personality disorders will certainly decompensate under the additional stress of deployment. These individuals are at risk for becoming non-mission capable and requiring redeployment for medical care. This places both mission success and their fellow servicemembers at risk and places an additional unnecessary burden on in-theater medical assets and the casualty evacuation system. The units from which these Marines and Sailors are removed then have the burden of trying to find replacements or spreading the workload left behind by their missing personnel.

If these members are identified prior to deployment and replaced while in garrison, the unit has a much greater likelihood of maintaining its fighting strength through the deployment. The two most common issues of orthopedic injury and mental health should be addressed individually:

- **Orthopedic injury:** A recurrent problem is that when a servicemember is injured, whether on duty or off, and requires in excess of 30–45 days for appropriate treatment and recovery, they are required to be placed on a limited duty board. This does not happen in all cases, especially for those who can use specialty care from a non-medical treatment facility physician and with senior noncommissioned officers and officers. If the limited duty board is not processed, then there is no accountability for the treatment period or justification for a non-deployable status. According to Headquarters Marine Corps, this member remains in a full-duty status, even at the time they are on the operating table. When it comes time for deployment, the unit cannot request a replacement, because according to the unit diary, they already have the required strength.
- **Mental health:** If a servicemember is having difficulty in garrison, the stress of deployment will only exacerbate his condition. Each case must be addressed individually, and even if the servicemember is stable and functioning well, the medications that may be required in order to maintain this level of function are not always compatible with the combat environment. It is the responsibility of the unit medical officer to be aware of any chronic medical conditions within his unit, and review each case individually for the servicemember's suitability for deployment. Once

reviewed, the medical officer must clearly communicate his medical recommendations to the unit commander so that appropriate and informed decisions can be made.

Recommendation

Follow requirements as mandated in the Navy Manual of Medicine for the processing of limited duty boards for all Marines and Sailors with injuries or illness requiring a prolonged period of treatment and recovery. Servicemembers must also be held accountable for nondisclosure of chronic medical conditions that interfere with their deployability. This is particularly important in reserve units where there is often no military record of medical treatment from civilian providers, and the Marine or Sailor does not disclose his condition during predeployment due to a concern for privacy or recriminations. Ensure open communication between the medical officer and unit commander on all medical issues and deployment status recommendations.

Implications

If these recommendations are followed and closer scrutiny is given to servicemembers with ongoing medical issues, the rate of medical redeployment for DNBI issues should decrease significantly for both physical and mental health issues. This will benefit the unit as it will contribute to maintaining fighting strength and unit morale, as healthy Marines and Sailors will not feel they are being asked to carry the extra load when someone goes home early for a non deployment-related issue. Additionally, those servicemembers with medical issues will remain in the appropriate environment to provide them with the best chance of recovery and return to full duty, as opposed to the significant risk of permanent disability due to inappropriate activity or insufficient rehabilitation in the deployment theater. While a unit commander may initially feel that he is losing too many bodies, ultimately he will have a better chance of replacements and maintain more fighting strength by leaving those individuals identified as non-deployable in garrison and only taking those Marines and Sailors who are fully mission capable.

Event description

There are multiple instances of Marines and Sailors requiring redeployment from the combat theater due to chronic illness or non-battle injuries that were identified prior to deployment. If properly evaluated and documented, these servicemembers would not have deployed until they were fit for full duty, thus dramatically increasing their chance of remaining in theater for their full deployment tour.

Topic: OIF 06-08 Battle Aid Station Provider Issues

Discussion

The battalion aid station (BAS) at Habbaniyah is a fully capable Echelon I treatment facility, complete with defibrillator, oxygen, suction, intubation equipment, chest tube, and cricothyroidotomy kits. Although the primary function of the aid station is stabilization and transport of traumatically injured patients, it is mostly utilized for sick call. The BAS in Habbaniyah is the only coalition facility on base with a medical provider. It is the primary treatment facility for all Marines, Sailors, and Soldiers on base. It also receives regular consults from contractors and, occasionally, local nationals. Additionally, due to the nature of the war and the presence of greater number of reserve battalions, there are a higher proportion of older servicemembers with chronic illness. Although the BAS is well suited for trauma, its sick call capabilities can be improved significantly with some additional equipment. Access to references and consultants can sometimes be difficult especially for the providers at the satellite aid

stations. Many online medical sites are blocked on the Non-Secure Internet Protocol Router (NIPR). Additionally, some of the combat operational posts do not have NIPR and have limited Internet connectivity. Bringing personal references, including a good pharmacopeia, can be very helpful. These steps are especially important for cooperative medical engagements (CMEs). CMEs are events in which medical personnel from the battalion, in conjunction with Iraqi physicians, assist in providing medical care for local nationals within the battalion's area of operations. The medications that are available during CMEs are bought from local vendors by civil affairs. Since the medications are bought locally, most of them only have their brand name in English and everything else is usually in Arabic. Being able to look up the usage of the medications available is vital in running an effective CME.

Recommendation

It is recommended that the following additional equipment be brought to augment the battalion aid station at Habbaniyah: personal stethoscopes; medical references, including PDA and pharmacopeia; a 12-lead EKG; Portable Ultrasound, Doppler; and potassium hydroxide.

Topic: OIF 06-08 BAS Communications

Discussion

Communication with higher echelons of care has consistently been unreliable. Defense Secure Network connectivity outside of Camp Habbaniyah has been nonfunctional. On the rare occasions that the call does go through, the quality is not sufficient to allow for any meaningful conversation. Thus, communication with higher echelons is primarily dependent on satellite phone and email. However, both of methods are not without drawbacks. The clarity of the satellite phone is dependent on weather, and the coverage is often not reliable. However, the satellite phone is the best tool the battalion currently has to get patient updates and to contact other treatment facilities. Most medical consults and setting up patient appointments at higher echelons occur via email. However, due to the distance of the BAS from the communication shop, NIPR access can be interrupted due to the weather. Heat can slow down and completely interrupt email and Internet connectivity on NIPR. Another reoccurring communication obstacle faced by the BAS is maintaining an accurate list of medical consultants available at the different medical treatment facilities within Iraq. Typically the consultants available will change a couple of times throughout the deployment due to transfers and reassignments. Not having an updated provider list can significantly slow down referrals and patient care. Even after turnover, it often takes several weeks for a new provider list to become available.

Recommendations

The eventual addition of commercial phone lines and the upgrading of the NIPR switches that feed the BAS should improve both voice and data communication capabilities of the BAS. Even with these additions and upgrades, it is recommended that Voice Over Internet Protocol lines be brought into to BAS to improve communication capabilities.

Establishing points of contact for the most commonly utilized consultants (dermatology, otolaryngology, and orthopedics) in the rear can significantly reduce wait time for feedback regarding patient questions.

It is recommended that the BAS contact and request a list of providers available at all the higher echelons of care.

Topic: OIF 06-08 BAS Animal Vectors

Discussion

From a preventive medicine standpoint, Camp Habbaniyah was in very good condition upon the battalion's arrival. One of the major issues initially faced was the amount of feral animals inhabiting the camp. Due to the high number of abandoned buildings and lack of any true barriers to the Iraqi part of the base (East Camp), there were a high numbers of animals on bases. Through the utilization of traps, the numbers of wild animals have declined over several months. The feral animals are still potentially a threat due to the possibility of acquiring infections from the bite of an affected animal. Although the civilian vector control personnel on camp can place traps, they are not allowed to euthanize any of the animals. Euthanizing the animals that are trapped is the responsibility of trained medical personnel in the BAS.

Recommendation

It is important to identify medical personnel who will be trained to euthanize animals. It is recommended that personnel identified to conduct euthanizations get immunized with the rabies vaccine prior to entering country. It is also recommended that the incoming battalion continue to strongly enforce the no pet policy.

Topic: OIF 06-08 BAS Eyeglasses and Inserts

Discussion

Obtaining eyeglasses and inserts in theater has been a very slow and difficult process. The battalion has many Marines and Sailors who do not have ballistic inserts. Military-issued eyeglasses are not ballistic and do not fit well under issued eye protection glasses. For Marines who do not have current prescriptions, there are very few optometrists in theater. The closest military base with an optometrist to Camp Habbaniyah is Al Asad. The optometrist there, however, can be brought to Habbaniyah to conduct eye examinations. Even if the servicemember has a current prescription, obtaining new eyeglasses and inserts in theater can take between a couple of weeks to several months.

Recommendation

It is recommended that servicemembers have an exam with valid prescription dating no later than one year. Ensure all eyeglasses are ordered no later than three months prior to deployment to allow ample time for delivery and distribution. It is recommended that all servicemembers who require eyeglasses have a copy of their last optometry evaluation in their skeleton health record.

Topic: OIF 06-08 BAS Patient Tracking

Discussion

Patient tracking is one of the most important functions of the BAS while in Iraq. Patient tracking through the BAS is the primary way the battalion receives status updates and locations of evacuated Marines. The primary way patient status is obtained is through the Joint Patient Tracking Application (JPTA) program on the Internet. Additional follow-up information can be obtained by calling the medical facility directly. A daily status report is submitted to designated officials within the battalion. One major obstacle faced with patient tracking is that many

medical treatment facilities (MTFs) require a letter with the names of individuals who are allowed to receive patient information. Without this letter, patient information will not be disclosed.

Recommendation

A letter from the commanding officer identifying all personnel authorized to receive patient information should be generated. At a minimum, include the battalion executive officer, medical officers, senior medical enlisted, and the casualty tracking corpsman. Copies of the letters should be sent to Marine liaisons at both continental United States (CONUS) and theater MTFs. CONUS MTFs should include National Naval Medical Center Bethesda, Walter Reed Army Medical Center, Brooke Army Medical Center, and Naval Medical Center San Diego. Theater MTFs should include Baghdad, Balad, Fallujah Surgical, Al Asad, Al Taq Aadam, and Al Udeid. All providers and the patient tracker should establish JPTA accounts prior to deployment to ensure access.

Topic: OIF 06-08 BAS Post Deployment Health Assessment (PDHA)

Discussion

The battalion is required to have 100 percent completion of post deployment health assessments (PDHAs) prior to redeployment. This process cannot be started until 30 days prior to departure. Due to the long time interval between the predeployment health assessment (PHA) and the PDHA, most servicemembers forget their passwords for the site. Although the site does offer a password retrieval function, it often does not work. Because paper surveys are no longer accepted, site inaccessibility remains the primary reason PDHAs are not completed in the appropriate time.

Recommendation

PDHAs should be started 30 days prior to redeployment. This process ensures that ample time is allocated to complete PDHAs, while minimizing impact during turnover. A corpsman should obtain local administrator privileges, which will allow passwords to be manually reset. Local administrator privileges can be obtained by contacting the Electronic Deployment Health Assessment customer service at <edha@nehc.mar.med.navy.mil>.

Topic: Corpsman training

Observations

During the course of the current conflict, the focus on predeployment training for corpsmen has shifted to a trauma-heavy curriculum. This shift results in a degradation of their basic sick-call and physical exam skills, especially in the junior corpsmen who do not have several years of prior clinical experience. Because the vast majority of what corpsmen do is basic sick-call medicine (at least 90 percent), this lack of training has led to many inadequate evaluations and treatments and unnecessary medical evacuations to a higher level of care. The corpsmen working with the Fleet Marine Force are highly motivated and are very concerned with the quality of medical care they provide. They are expressing their frustrations and concerns with the training they are currently receiving.

Discussion

As the focus of the current conflict is shifting from an assault and combat-heavy operation to one of governance and supervision, the need for acute trauma skills in the corpsman assigned to Marine units is decreasing. While it will always be essential for them to be well-trained in trauma, the ability to perform basic sick-call medical care without direct supervision from a medical officer or independent duty corpsman (IDC) has been degraded to a level that is a concern.

As forward operating units move into smaller and smaller operating bases and segregate into platoon-size elements (or smaller) for transition team support and security details, the corpsmen assigned to them are forced to provide medical care with no supervision or ready contact with a higher level of care for consultation. In this environment, it is essential that the corpsmen are able to perform competent physical examinations and diagnosis and understand appropriate treatment principles for problems that fall within their scope of care.

While it is unrealistic to expect all basic corpsmen (military occupational specialty [MOS] 8404) to function as independent duty corpsmen (MOS 8425), more training and experience than what is gained in corps school is needed. Many corpsmen are deployed within months of graduating corps school and never have the opportunity to gain the experience and ability that can only come with time and seeing patients every day under the supervision and teaching skills of senior medical providers. As these corpsmen with the least experience are also the most junior in rank, they tend to draw the smaller unit element duty positions and find themselves the most isolated. A refocusing of corpsmen training is needed to improve the basic skills and competence the corpsman have, as they are seeing less trauma and more basic medical care issues.

There are several issues that can result from a lack of training. The first is that many potentially serious medical issues can be unrecognized and under treated, placing the patients at increased risk. Second, medical conditions are recognized but are then incorrectly treated due to the lack of experience and supervision. Third, unnecessary medical evacuations (MEDEVACs) may occur for conditions which could be easily treated at the corpsmen level if the corpsmen had a better fund of knowledge and experience prior to being placed in these situations. All of our corpsmen working with the Fleet Marine Force are highly motivated to provide the best possible care in the austere environment of deployment, and their training should set them up for success as much as possible.

Recommendation

Refocus the predeployment training for corpsmen back to basic sick-call medicine and fundamental medical care. Trauma care should remain a part of their training but should not be the main focus to the exclusion of basic care as it currently stands. Additionally, all junior corpsmen should have dwell time in a garrison clinic after graduating from corps school to develop skills and knowledge that will allow them to operate in the current deployment scenarios rather than being immediately cycled into deployment with forward operating Marine units.

Implications

If these recommendations are followed, there will be a higher level of medical care delivered at the squad and platoon levels, resulting in fewer inappropriately treated medical conditions, with a subsequent decrease in DNBI loss of work time, fewer MEDEVACs, and the important final result of maintaining the maximum possible fighting strength.

Member perspectives on this observation/lesson

This issue can be addressed in garrison with the sick call screener's course. This is typically run by the unit's medical department. We instituted a sick call screener's course within the branch medical clinic at Camp Pendleton to better prepare our corpsmen for deployment as well as to support our daily mission. The sick call screener's course can be set up by your senior enlisted and your medical officer. On returning from deployment, everyone should be preparing their staff for the next deployment.

Training requirements are driven by the assessment process you use to determine areas that need reinforcement or retraining. What tools and techniques do you use to assess your training requirements? These observation point directly to predeployment training failures and failures to recognize what training needs to occur. Conducting unneeded training is also a waste of time and resources as well. The battlefield today is where servicemembers need to be able to perform the basic tactical combat casualty tasks that as a corpsman they should have mastered. While training for both sick-call and trauma are important, we are currently losing more servicemembers to trauma. Once a skill is mastered, only refresher training is required. Medical personnel should be able to control bleeding, clear or establish airways, and treat chest trauma without thinking. If they have to stop and think about the next step in the process then they have not mastered their basic skills.

Topic: Effective in-Theater Treatment of Mental Health Casualties

Observations

The system that RCT-2 inherited for the treatment of mental health patients upon arrival to the area of operation (AO) was that all patients within the RCT were sent to the base (Al Asad) mental health clinic or combat support hospital (CSH). This step resulted in a loss of visibility in patient care and disposition, with a subsequent high rate of redeployment due to mental health issues.

Discussion

The system established by RCT-2 mental health was the PIES model (proximity, immediacy, expectancy, simplicity). If a patient was experiencing mental health problems to the level that he was unable to perform his duties, the parent unit first referred the patient to its medical officer. The medical officer completed an evaluation and developed an intervention to return the Marine to full duty. He would consult with the regimental mental health provider on these interventions. If this intervention was unsuccessful, the patient was pulled from his unit and returned to regimental headquarters to receive mental health treatment. The patient was kept separate from other patients at the regimental aid station, and the patient's command liaison, located at regimental headquarters, took responsibility for the patient. On the day of his first mental health evaluation, the patient was given the date he would return to his unit. This was usually 3-7 days after his arrival. Thus, the patient and his command were aware when the patient should be returned. Mental health treatment involved daily one-on-one treatment sessions with the licensed provider (no para-professionals). Treatment may be supplemented with para-professionals in various life skills classes that were available (anger/stress management), but this was only adjunct treatment. During this treatment phase, if it was determined that a higher level of care was needed, such as for an acutely suicidal patient, they would be immediately referred to the CSH. All personnel who were treated and returned to their units in this system subsequently completed their deployment. Through this model, RCT-2 was able to maintain a 96 percent

return to duty rate for mental health issues during this deployment, significantly higher than the approximately 60 percent documented by the base mental health assets.

Recommendation

This mental health treatment system is recommended for treatment of mental health casualties in all Marine RCTs. In order for this to be implemented, it is necessary that each RCT have its own integral mental health provider. This provider needs to be either a clinical psychologist or psychiatrist, preferably with experience in acute stress reaction, PTSD, and personality disorder diagnosis and treatment. It is essential that the mental health provider work closely with the regimental medical officer for a coordinated care effort.

Implications

Personnel who were treated by the base mental health resources rarely returned to their parent unit. The system used at this facility was the one-session-per-week model, which is judged to be inadequate in a combat environment. They also failed to give the patient the expectation of return to their parent unit by not given the patients the date of their return to their unit during the first meeting. By using the above model instead, a much higher return to duty rate and subsequent maintenance of fighting strength will be seen.

Topic: Casualty Tracking

Discussion

For non-combat-related injuries not requiring evacuation to Germany, a personnel casualty report (PCR) is not required. All combat-related injuries require a PCR, as the PCR is the basis for awarding the Purple Heart Medal. PCRs are submitted through the Defense Casualty Information Processing System. Accurate information for the PCR should be collected through the battalion medical officer. Once all information is collected, PCRs are submitted to the regiment and will eventually result in next of kin notification. During the early stages of casualties it is often more efficient for S1 to call hospitals directly in order to receive the most timely and accurate information for PCRs. Once casualties have reached Baghdad, Balad, or Germany, it becomes easier for BAS to track casualties. Sometimes the most accurate and up-to-date information will be posted on the Secure Internet Protocol Router Marine Expeditionary Force Casualty Tracking Web page. While BAS maintains its own sick and injured rosters, S1 tracks casualties until they MEDEVAC to CONUS.

Recommendation

Establish casualty tracking procedures between S1 and BAS prior to transfer of authority. Maintain all hospital phone numbers in a prominent location. Practice PCRs until all members of the S1 section are comfortable with the format. Understand that PCR requirements may change while in theater.

Topic: Battle Numbers

Discussion

To assist with casualty tracking, 1/1 implemented a system of battle numbers in the following format: AS1234. This would correspond to a Marine in Alpha Company with the last name Smith with the last four digits of his social security number 1234. All personal information is

tied to this number via a battalion database to include blood type. Battle numbers prevent confusion when dealing with multiple casualties and allow for the rapid transfer of personnel information between the company to battalion chain of custody.

Personnel information clog communications nets with long transmissions of personnel information.

Recommendation

Implement a form of battle tracking that enables the submission of casualty information.

Topic: Mine Resistant Ambush Protected Vehicles Restraint System Safety Issue

Observations

The mine resistant ambush protected (MRAP) vehicle's seatbelt/restraint system is inadequate in preventing head and neck injuries, which can result in death or permanent disability. The MRAP vehicles have been a marked improvement in reducing coalition force injuries due to improvised explosive devices (IEDs), though serious injuries still occur. We have seen an increase in head and neck injuries due to rollovers that occur secondary to driving errors and IED attacks. When questioned, most of the individuals were not wearing their seatbelts. There is a resistance to wearing seatbelts when transiting bridges or driving near water, for fear of being trapped by the restraint and drowning. There is also the concern that the restraints allow upward movement resulting in head and/or neck injuries. A final concern is that the design of the current restraint makes it difficult to remove and catches on personal protection equipment (PPE), delaying egression from the vehicle.

Discussion

The current restraint system is not being consistently used due to fear of being trapped by the restraint. A 5-point restraint system with a single hand release like those used in aviation would alleviate that fear while providing increased protection from injury and reducing entrapment on PPE:

- The 5-point restraint system reduces upward movement in a rollover helping to reduce head and neck injuries.
- The 5-point restraint system does not require placing your arms through a looped restraint that catches on PPE and delays egress from the vehicle.
- The 5-point restraint system is easier to adjust for variations in size of the individual member, allowing a more secure fit helping to reduce injury.

A training system similar to the helo dunker needs to be developed to improve comfort and confidence in egressing from submerged vehicles.

Use of a 5-point restraint system will help reduce head and neck injuries incurred in MRAP vehicle rollovers, while increasing confidence in the system leading to improved use by military personnel. The 5-point restraint system will also allow faster egress from the vehicles while reducing the chance of entrapment on PPE. The 5-point restraint in conjunction with MRAP vehicle submersion training will improve compliance in use of the restraint as well as member confidence in his ability to egress from the vehicle.

Recommendations

Install a 5-point restraint system similar to those used in aviation to reduce injuries and improve survival in MRAP vehicle rollovers.

Establish MRAP vehicle submersion training to improve compliance in the use of the restraint system, while improving member confidence in his ability to safely egress from the submerged vehicle.

Implications

We continue to see preventable injuries due to non-use of the restraint system.

Comments

1st Marine Logistics Group has submitted a urgent universal needs statement for MRAP vehicle safety restraint systems during April 2008.

Event description: We had a number of head and neck injuries secondary to MRAP vehicle rollovers in members not wearing their seatbelt restraint system. I then had an opportunity to ride in an MRAP vehicle and noticed I was one of the few to use the restraint system. When I questioned others in the vehicle, they explained the difficulty getting out of the restraints in an emergency, as well as a fear of using them when transiting over bridges or near canals. They noted a lack of egress training specific to the MRAP vehicle.

Chapter 8

Guidelines for the Prevention of Infection after Combat-Related Injuries

Duane R. Hospenhal, MD, PhD, Clinton K. Murray, MD, Romney C. Andersen, MD, Jeffrey P. Blice, MD, Jason H. Calhoun, MD, Leopoldo C. Cancio, MD, Kevin K. Chung, MD, Nicholas G. Conger, MD, Helen K. Crouch, Laurie C. D'Avignon, MD, James R. Dunne, MD, James R. Ficke, MD, Robert G. Hale, DDS, David K. Hayes, MD, Erwin F. Hirsch, MD, Joseph R. Hsu, MD, Donald H. Jenkins, MD, John J. Keeling, MD, R. Russell Martin, MD, Leon E. Moores, MD, Kyle N. Petersen, DO, Jeffrey R. Saffle, MD, Joseph S. Solomkin, MD, Sybil A. Tasker, MD, Alex B. Valadka, MD, Andrew R. Wiesen, MD, MPH, Glenn W. Wortmann, MD, and John B. Holcomb, MD

Disclaimer: The opinions or assertions contained herein are the private views of the authors and are not to be construed as official or reflecting the views of the Department of the Air Force, Department of the Army, Department of the Navy, Department of Defense, or the U.S. government. This work was prepared as part of their official duties and, as such, there is no copyright to be transferred.

Executive Summary

Management of combat-related trauma is derived from skills and data collected in past conflicts and civilian trauma and from information and experience obtained during ongoing conflicts. The best methods to prevent infections associated with injuries observed in military combat are not fully established. Current methods to prevent infections in these types of injuries are derived primarily from controlled trials of elective surgery and civilian trauma, as well as retrospective studies of civilian and military trauma interventions. The following guidelines integrate available evidence and expert opinion from within and outside of the U.S. military medical community to provide guidance to U.S. military health care providers (deployed and in permanent medical treatment facilities) in the diagnosis, treatment, and prevention of infections in those individuals wounded in combat. These guidelines may be applicable to non-combat traumatic injuries under certain circumstances. Early wound cleansing and surgical debridement, antibiotics, bony stabilization, and maintenance of infection control measures are the essential components to diminish or prevent these infections. Future research should be directed at ideal treatment strategies for preventing combat-related injury infections, including investigation of unique infection control techniques; more rapid diagnostic strategies for infection; and better defining the role of antimicrobial agents, including the appropriate spectrum of activity and duration.

Introduction

Infections have complicated the care provided to those wounded in war throughout recorded history.¹⁻³ In addition to the protection afforded by personal body armor, there have been numerous advances in the care provided to combat casualties. These advances include enhancement in the training and expertise of combat medics that enable life saving care to be provided at the point of injury and the rapid evacuation of casualties to surgical care provided in close proximity to the point of injury. These advances have enabled personnel to survive near catastrophic injuries; however, they have also placed a greater demand on the healthcare infrastructure by increasing the numbers of patients needing optimal functional rehabilitation and long-term care.

The patterns of injury sustained in combat are predominately extremity injuries (~65%), followed by head and neck (~15%), thorax (~10%), and abdomen (~7%) injuries; burns

complicate approximately 5-10 percent of all combat casualties. Infectious risks associated with these injuries include those from initial wound contamination and from nosocomial infections associated with long-term care. The latter often involve multiple drug resistant bacteria (multidrug-resistant organisms [MDROs]) as has been seen in the current U.S. military conflicts.¹²⁻¹⁷

Guideline Development

Our committee was established to evaluate the current military and civilian literature and to provide recommendations for a clinical pathway to manage combat casualties using the best available medical evidence recommendations. The committee members consisted of military and civilian experts in infectious disease; trauma; preventive medicine; infection control; and surgical specialties including general surgery, critical care, orthopaedic surgery, neurosurgery, oral maxillofacial surgery, otolaryngology, and burn surgery. Physicians included personnel recently deployed to Iraq and Afghanistan as well as several with military medical experience in the Vietnam conflict. Clinical experience includes caring for combat casualties at the point of injury and throughout the evacuation chain including initial field stabilization; initial surgical stabilization; and care in the combat zone, at U.S. military hospitals in Germany, and in the U.S.

Five teams reviewed the military and civilian trauma literature prior to the guideline conference to draft recommendations for the treatment of casualties based on the available evidence. At the conference on June 11 and 12, 2007, sponsored by the United States Army Office of the Surgeon General and hosted by the United States Army Institute of Surgical Research at Fort Sam Houston, TX, all participants discussed the presented data and draft guidelines. The medical literature and current surgical practices were reviewed by these five subgroups according to anatomical site or type of injury: extremity, central nervous system, thoracic and abdominal cavity, head and neck, and burns.

Experts involved in the development of the guidelines were asked to review the literature and develop recommendations for the reduction or prevention of infections in combat-related injuries. The first priority was to evaluate military trauma related articles with an emphasis on well-conducted randomized control trials or cohort studies that could be incorporated into the guidelines. In addition, civilian trauma articles, primarily randomized control trials, and then cohort studies were evaluated. An attempt was made to assign a level to denote both the strength of recommendations and quality of the evidence available to support those recommendations. The Infectious Diseases Society of America (IDSA)/U.S. Public Health Service (USPHS) rating system was utilized (Table 8-2). Limitations in using any rating system were noted early in this review process. For our guidelines, these included the fact that randomized controlled trials have not been performed in combat zones and that generalizing civilian trauma care data to combat trauma care may not be valid due to differences in mechanisms of injury, time to access, diagnostic capabilities at initial receiving facilities and the austere nature of many of those facilities, and access to and type of medical care systems.

Efforts also were made to ensure that these recommendations could be applied across all the different levels of medical care in a combat zone, and could be modified based on the equipment and medical expertise available at each level. Finally, management strategies had to incorporate possible differing evacuation times and the management of personnel not evacuated out of the combat zone. After the guidelines were summarized, they were again disseminated to all participants for discussion. Additional discussion of the data supporting specific recommendations is provided in the reviews (by anatomical site/type of injury) within this *Journal of Trauma* supplement.

Current Situation

The management of combat casualties within a combat zone and throughout the evacuation chain from point of injury to definitive rehabilitative care in the U.S. is a complex system. Casualties are managed by numerous physicians at varying levels of medical care in and out of the combat zone. These injured patients may pass through as many as five medical treatment facilities from the time of injury to their return to the U.S., spending only a few days at each facility.^{12,18} The average evacuation time has been seven days from injury to arrival in the U.S.^{12,18} This results in numerous hand-offs, fragmentation of care, and loss of continuity. A particular example of this related to infection is the fact that culture results are available only after the casualty has been evacuated. Additionally, medical personnel assigned to care for combat-related trauma have varying clinical trauma experience and training prior to arrival in the combat zone. Deployments range from as short as 3-4 months for Air Force and Army reservist physicians to 15 or more months for Army medical personnel (typically 6 months for surgeons) resulting in various levels of experience and sometimes conflicting management strategies.

Combat casualties are often colonized or infected with MDROs, likely due to nosocomial transmission in and out of the combat zone.^{14-16,18,19} Few antimicrobial agents reliably cover these pathogens, necessitating rigorous antibiotic stewardship and infection control strategies in order to minimize their impact on the health of the injured.

At this time, the only summary of treatment strategies for managing combat casualties is the Emergency War Surgery textbook. Unfortunately, it is limited by summary statements without evidence-based recommendations and does not incorporate many of the lessons learned from current conflicts.⁶ By reviewing and summarizing the best current evidence and expert opinion, we hope to reduce practice variation inside and outside of the combat zone to further optimize care for injured personnel. It is expected that these guidelines will need to be updated periodically to incorporate advances in trauma management and to ensure the recommendations are appropriate for future combat environments and medical evacuation systems.

Target Patient Population

The pool of potential patients in the combat zone includes both military (U.S. and coalition) and civilian (U.S. government, foreign contractor, and indigenous) personnel. The patterns of trauma associated with combat include all anatomical regions and are most commonly the result of either explosive devices with associated fragmentation injuries or gun shot wounds.^{5,20-22} Military trauma patients are more likely to have multiple etiologies for their injuries; that is, they may present with a combination of blunt and penetrating trauma, often with burns and occasionally blast overpressure injuries. U.S. military casualties are predominately young men without co-morbid illnesses.⁵ In contrast, the civilian victims of combat zone trauma more frequently have co-morbidities such as hypertension and diabetes that complicate wound care.²³ A distinct management difference between these two populations is the rapid evacuation of U.S. casualties out of the combat zone. Although there are some drawbacks to the rapid evacuation policy, it allows for long-term definitive care and prolonged follow up to begin in the U.S. quickly, often within several days of injury. Civilian personnel managed in the combat zone often receive initial damage control surgeries and care with one primary team of physicians. Although long-term follow up is not provided, transfer of civilian patients to local facilities is often delayed until the patient is stabilized, often requiring days in U.S. military intensive care units (ICUs).

Target Provider Audience

The target audience is all healthcare providers rendering care to patients with combat-related injuries in the combat zone as well as military and civilian medical professionals caring for returning casualties.

Scope of These Guidelines

Management strategies for the care of combat casualties begin with the control of hemorrhage and definitive control of the airway and breathing using the concepts of tactical combat casualty care (TCCC).²⁴ The primary method to prevent the development of infection in penetrating trauma is rapid surgical evaluation and management. Treatment strategies vary by anatomical location; however, overall treatment strategies include an emphasis on irrigation, debridement, antimicrobial therapy, coverage of wounds, and stabilization of underlying bony structures.

Numerous strategies proposed to modify the rate of surgical site infections, including minimizing blood transfusion, controlling hyperglycemia, minimizing hypothermia, and providing adequate oxygenation will not be addressed in these guidelines. These guidelines also do not address the treatment of nosocomial infections associated with war trauma. All treatment facilities should establish and regularly update local antibiograms to direct empiric antimicrobial therapy for nosocomial infections. Timely microbiology support with susceptibility testing should be available to allow rapid de-escalation to directed short-course antimicrobial monotherapy, when possible. The role of an effective infection control program in modifying the risk of nosocomial transmission, especially of multidrug-resistant bacteria, cannot be over emphasized (Table 8-3).

Although institution of infection control procedures in the combat zone is challenging, certain key infection control methods can be readily implemented; these include institution of hand hygiene compliance, proper use of gloves, patient cohorting, appropriate isolation (contact, droplet, airborne), standard protocols for disinfection and/or sterilization of patient care equipment in a war setting, and appropriate environmental cleaning.^{18,25} Antibiotic control programs should be put in place in the combat zone to limit use of broad spectrum antimicrobial agents. These methods have been shown to be attainable and effective in the combat zone.²⁵ Finally, although these guidelines are designed to be applicable to various combat environments, many of the recommendations herein are based upon the current conflicts in Iraq and Afghanistan.

Prevention of Infection

Care at point of injury (Level I)

Initial care provided in the combat zone near or at the time of injury should emphasize safety of the patient and the personnel caring for the patient, controlling hemorrhage, and stabilization of breathing and airway per TCCC.²⁴ Wound care at this point consists of wound coverage and rapid evacuation. Casualty evaluation by a surgeon should occur within six hours of injury based on current doctrine (BII). If the intensity of battle and the environment allow, wounds should be covered with sterile bandages and the underlying bony structures stabilized to prevent further tissue injury (AII). If evacuation to surgical care is expected to be longer than 3 hours, antibiotics should be provided to the casualty as soon as possible (AII).

The TCCC committee makes recommendations of which antibiotics to use in the combat environment in the setting of delayed evacuation.²⁶ The selection of these agents is based on spectrum, ease of administration, stability, and storage limitations. These antibiotic

recommendations are not applicable to patients who can be rapidly removed from the battlefield or to those who have reached care at established medical facilities such as a battalion aid station (BAS). Based on mission, oral moxifloxacin has been placed into some personal medical kits (that also hold individual use items such as tourniquets, bandages, and pain medications) along with medic/corpsman medical kits. In the case of penetrating abdominal injury, shock, or when patients are unable to tolerate oral medication, the TCCC also has provided recommendations for intravenous or intramuscular agents to use in those wounded who cannot be evacuated immediately (Table 8-4).

Professional medical care without surgical support (Levels I and IIa)

Care at a BAS (Level I) is typically provided by a physician assistant and/or a general medical officer (general medical officer/physician with at least one year of postgraduate medical education, but typically a board-certified internist or internal medicine subspecialist, pediatrician or pediatric subspecialist, family physician, or emergency medicine physician). Level I facilities have no holding capability and are designed for routine sick call and trauma stabilization only. Typically patients are evacuated from these facilities within one to two hours of injury in Iraq, with slightly longer delays in Afghanistan. Although enhanced casualty care can be provided, the primary goal for most injuries is stabilization and evacuation to a surgeon within six hours of injury (BII). Primary wound management consists of wound irrigation with removal of gross contamination (BIII). The type of fluid ideally used for irrigation is normal saline or sterile water, but potable water (AI) may be used in the event these solutions are not available, with no change in outcome. Additives such as soap or antibiotics should not be included with irrigation fluids (DII). There is no “ideal” quantity of fluid, based upon size and location of injury; however, one to three liters are typically considered effective (BIII). The fluid should be delivered under low pressure (e.g., one liter plastic bottles with several holes punched in the lid, applied by squeezing the bottle to propel fluid into the wound) (BII). High pressure irrigation devices actually are associated with tissue damage. Wounds should be bandaged with a sterile dressing and underlying bony structures should be stabilized with available splinting materials to prevent further injury (AII). Eye injuries should be covered with hard protection (e.g., fox shield or similar improvised device). Pressure dressings over the eye should be avoided if a penetrating injury is suspected. Antibiotics, typically intravenous, should be given within three hours following injury (Table 8-5) (AII).

The agent of choice should reflect the injury site requiring the broadest spectrum of bacterial activity (AI); excessively broad empiric antimicrobial therapy should be avoided (DIII). For example, if the casualty has a penetrating abdominal injury and an extremity injury, the antibiotic recommended for abdominal injury has activity in excess of those recommended for extremity injury and is adequate for both. If rapid evacuation of the casualty to surgical care is expected (less than three hours), provision of antibiotics can be deferred to the receiving facility, although many feel antibiotics should be as soon as possible. Tetanus immunoglobulin or toxoid should be given as indicated (see below) (AII). It is acceptable to leave small, retained metal fragments in soft tissues; these may not require evacuation or evaluation by a surgeon (BII).²⁷ However, X-ray evaluation is necessary to adequately determine location and extent of injury, and this is not typically available at this level of care (see below).

Level IIa is typically a U.S. Army medical company that has physician assistants and GMOs providing care with a holding capacity of up to 72 hours; no surgical care is available. Management strategies at Level I (BAS) apply here as well. Care should still emphasize wound management and evacuation to a surgeon within six hours of injury (BII). Limited X-ray capability is available (plain films only, no radiologist), so local management of retained metal fragments in soft tissue may be possible.

Care with surgical support (Levels IIb and III)

Surgical care provided in the combat zone is available at Level IIb facilities via forward surgical teams, which are designed for damage control surgery and short-term holding of patients. Level III facilities are tertiary care referral facilities in the combat zone that provide resuscitation, initial surgery, and post-operative care (ICU, mechanical ventilation, and extended inpatient care) with enhanced diagnostic capabilities that include expanded laboratory support (including limited microbiology) and CT scans. Although casualties should be evaluated by a surgeon within six hours of injury (BII), there is no requirement for surgery to occur within that time window (CIII).

At initial surgery there is no indication for pre- or post-procedure microbial cultures (EII). Unless there is gross evidence of infection at subsequent debridements, wound cultures do not adequately predict subsequent infections or infecting pathogens. Wound cultures may lead to unnecessary courses of broad spectrum antibiotics and are thus highly discouraged.

Wounds should be aggressively debrided at the time of surgery (AII). Wound debridement should include removal of necrotic tissue, removal of readily retrieved foreign bodies, and careful evaluation of the remaining soft tissue. The goal of debridement is not to remove every small fragment (BII). For abdominal injuries, all non-viable solid and hollow viscera should be debrided and most solid organ (i.e., liver and pancreas) injuries drained. Small wounds to hollow viscus may be primarily repaired but caution should be applied for resection and reanastomosis, especially in those with significant physiologic derangement. For colon wounds requiring resection, diversion is recommended in most cases. Skin should rarely be closed due to excessive infectious complications (BIII). Burns should be debrided early, typically at the initial presentation to the surgeon or within the first 24 hours as the eschar serves as a major source of subsequent infections (AIII).

Certain injuries have a higher associated morbidity with immediate surgical intervention by an untrained subspecialist, that outweigh the infection preventing benefits of immediate debridement. Debridement of eye structures should wait until ophthalmologic surgical expertise is available. Not all foreign bodies introduced into the eye require urgent removal as infectious risks are small as long as removal of the foreign body occurs in a reasonable amount of time (BII). Foreign bodies can remain in the spine if there is no evidence of infection or neurological decline (CIII). Not all foreign material introduced into the brain requires removal (BII). The destruction associated with attempts to completely debride the brain may have substantial negative functional impact.

Wounds should be adequately irrigated following debridement with copious fluid. For extremity injuries, three liters of fluid are typically used for Type I fractures, six liters for Type II fractures, and nine liters for Type III fractures (Table 8-6) (BIII). For other wounds the recommendation is irrigation until the wounds are “clean.” For abdominal injuries this is typically six liters (BIII). The recommended irrigation fluids are normal saline or sterile water unless these are not available; then potable water is adequate (AI). There are no data supporting fluid additives and there is some data indicating they negatively impact wound healing (such as the toxic nature of betadine), and they can impair host defenses (DII). Fluid should be delivered under low pressure (typically less than 14 pounds per square inch) as high pressure has potential tissue and bone destructive properties (low pressure irrigation (BIII); high pressure irrigation (DII)).

Antibiotics should be given intravenously within three hours of injury and as soon as possible following injury (AII). The agent(s) used should cover the pathogens likely to be contaminating the wounds at the time of injury; these may include normal cutaneous and enteric flora such as

Staphylococcus, E. coli, and alimentary tract anaerobes (AI). Initial antibacterial activity should not be directed at multidrug-resistant pathogens such as *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, or *Klebsiella pneumoniae* (DII). Given the low number of methicillin-resistant *Staphylococcus aureus* (MRSA) infections and clinical data indicating that drainage and not antibiotics is the primary therapy of abscesses (even those secondary to community-acquired MRSA), empiric MRSA therapy with vancomycin does not appear necessary (DII).

Agents should again reflect overlapping activity focused on the injury that requires the broadest spectrum of bacterial activity. Burn patients do not require systemic antibiotics unless there is evidence of infection or if antibiotics are indicated for treatment of other injuries (DI). There are data that suggest the use of broad spectrum antibiotics often leads to the development of subsequent infection with resistant pathogens. The duration of antibiotic therapy should be minimized as indicated in the Table 8-5 (BII). Prolonged therapy has been shown to worsen outcomes. Antibiotics should not be used just because the wound is “open” or because a drain remains in place (BIII). The presence of a chest tube alone does not require ongoing antimicrobial therapy. The role of topical antimicrobial therapy is clear for burn patients (AII).

For full-thickness burn wounds, mafenide acetate every morning and silver sulfadiazine every evening is recommended. Silver sulfadiazine once daily is acceptable for partial thickness burns or for burns of limited extent. When twice daily dressing changes are impossible, once per day changes will still provide significant benefit. It is essential to thoroughly debride and cleanse the wound at each dressing change using chlorhexidine gluconate (4%). For partial thickness burns, biobrane is adequate for simple coverage of clean wounds. For burns of limited extent (e.g., < 30% total body surface area), silver impregnated dressings are adequate. Antibiotic impregnated beads for open fractures may be an appropriate therapy for personnel not being evacuated out of the combat zone who will also have an appropriate follow up (BII); their use is not supported for U.S. personnel being evacuated one to three days after injury (DIII). Tetanus immunotherapy should be implemented as described in a subsequent section (AII).

Combat wound management includes delayed primary closure (not in theater) for extremity wounds; however, injuries to the face and brain require early closure of the mucosal lining or dura to decrease infections that are significantly higher in the central nervous system without early closure and cosmetic complications (BII). Early primary repair of complex or destructive colonic injuries is not recommended (BII), especially if associated with massive blood transfusion, on-going hypotension, hypoxia, reperfusion injury, multiple other injuries, high velocity injury, or extensive local tissue damage. However, simple, isolated colon injuries may be repaired primarily (AI). Skin should not be closed if there is a colon injury or extensive devitalized tissue due to excessive infectious complications (BIII).

Vacuum-assisted closure (VAC) has been shown to be effective for personnel not being evacuated out of the combat zone when used in extremity and abdominal injuries (BII). The role of VAC in personnel being evacuated is currently being evaluated and initial results are encouraging. At this time, wound VAC should be cautiously used during air evacuation until further data are available (CIII). It is currently postulated that limitations of VAC usage in this setting are largely secondary to a need for proper training in its use during flight. In the past, cranial bone has been retained in the abdominal wall, but given high infection rates and successful use of cranial prosthetics, this procedure has been discontinued (EIII).

Underlying bony structures should be stabilized to prevent subsequent infections. External fixation is currently recommended at Level III care for extremity wounds (AII); however, there are data reporting infectious complications with transcutaneously placed pins, so close clinical monitoring is necessary.

To prevent long-term infectious complications associated with trauma, patients requiring splenectomy should receive immunization against encapsulated organisms (e.g., *Haemophilus influenzae*, pneumococcal and meningococcal vaccines), ideally at 14 days of injury as this provides optimal immune reconstitution (CIII).

Care of personnel not evacuated rapidly out of the combat zone

In the current combat zones, there is a large non-U.S. patient population that is receiving damage control surgery and definitive therapy without evacuation to higher levels of care. This population frequently represents 60–80 percent of all injured casualties admitted to the Level III facilities. These patients may be at significant risk for multidrug-resistant colonization and infection as they often remain in facilities for long periods and have higher risks of developing MDRO infections, especially if aggressive infection control procedures are not followed. As such, they should be carefully managed to prevent nosocomial transmission within the facility and, indirectly, throughout the evacuation chain. In the combat zone, these patients should be evaluated for signs and symptoms of infection, and aggressive management strategies for the prevention of nosocomial infections should be implemented. This should include infection control procedures outlined above and aggressive antibiotic control programs.

Other Issues

Tetanus immunotherapy

Therapy for tetanus is well-founded and should be the standard of care. Immunized individuals should receive a booster dose of tetanus toxoid based on standard guidelines. Those subjects who have not been immunized should receive anti-tetanus human immunoglobulin in most cases, unless wounds are clean and care not delayed. In addition, these casualties should receive tetanus toxoid at the time of injury and again in four weeks and six months later.

Small retained fragments

The weaponry commonly used in ground combat operations can result in numerous small fragments lodged into the soft tissue of the body. Often, the sheer numbers of fragments make them difficult or impossible to remove. Non-operative management is recommended in these patients if they have soft tissue injuries only (no fractures, no joint involvement, no major vascular involvement, and no break of pleura or peritoneum), wound entry/exit lesions less than two centimeters in maximum dimension, and do not show evidence of frank infection (BII). Management should include wound irrigation if possible, cleaning and dressing the wound, and administration of anti-tetanus immunoglobulin and toxoid as necessary. A single dose of antibiotics may be employed for management of these wounds as described in the Table 8-5 for extremity injury. Some suggest a five-day course of antimicrobial therapy, but this is not likely needed. Removal of intraocular fragments may be delayed in the absence of infection (endophthalmitis); but consultation with an ophthalmologist as soon as possible is required.

Areas for Future Research

At this time, there are countless areas needing further randomized, controlled studies to determine the best treatment strategies for prevention of combat-related injury infections. The best infection control measures to prevent subsequent nosocomial infections are also needed. Priorities should include focus on evaluation of ideal antimicrobial regimens for use at the time of injury and the ideal duration of antibiotic therapy. Further assessment of the role of wound VAC and use of earlier closure of some lower risk injuries is also needed. There needs to be a

method to provide physicians the ability to rapidly detect pathogens that are associated with infection to not only initiate therapy as early as possible but also to limit the exposure of patients to prolonged overly broad spectrum antibiotics, especially in an environment associated with rapid evacuation.

	World War I	World War II	Korean War	Vietnam War	Gulf War	Somalia	OIF/OEF
Injury site (%)							
Extremity	70	58-75	67	61-74	56-65	75	54
Head/neck	17	4	17	14	11	14	16
Thorax and abdomen	6	12	14	12	6-12	6-15	11
Mechanism of injury (%)							
Explosive devices	–	–	–	–	–	–	36
Bullet	–	33	–	30	5-20	42	16
Mortar	–	39	–	19	–	–	9
Artillery	–	11	–	3	–	–	8
Grenade, including rocket-propelled	–	13	–	23	–	–	16
Land mine/booby trap	–	2	–	17	–	–	2
Fragments*	–	–	–	–	63-95	43	–
Time to evacuation (hours)							
	12-18	10	4-6	1 hour- 31% 4 hours- 86%	0.67† 4.41‡	Up to 14	1-2
Died of wounds (%)							
	8 (of 153,000 wounded)	4.5 (of 599,724 wounded)	2.5 (of 77,788 wounded)	3.6 (of 96,811 wounded)	2.1 (of 143 wounded)	6.4 (of 62 wounded)	–
Wound infection rate (%)							
	–	–	–	4	–	19	–

* Somalia and Gulf War study grouped all mechanisms into bullets, fragments, or other

† Prior to the ground war

‡ During the ground war

Table 8-1: Historical overview of injury patterns, mechanisms of injury, time to presentation, died of wounds rates, and infection rates

Adapted from *Annals of Surgery*, 243:715-729, 2006; *Journal of Trauma*, 49:515-528, 2000; *Journal of Orthopedic Trauma*, 21:254-257, 2007; *Emergency War Surgery*, 3rd U.S. revision, 1.1-1.5, 2004; *Journal of Trauma*, 18:635-643, 1978; *Journal of Trauma*, 40(3 suppl):S165-S169, 1996; *Military Medicine*, 158:508-512, 1993; and *J R Army Medical Corps*, 152:202-122, 2006.

Strength of Recommendation		Quality Of Evidence	
Category	Definition	Grade	Definition
A	Good evidence to support a recommendation for use	I	Evidence from at least one properly randomized controlled trial
B	Moderate evidence to support a recommendation for use		
C	Poor evidence to support a recommendation for or against use	II	Evidence from at least one well-designed clinical trial without randomization or from cohort or case-controlled studies
D	Moderate evidence to support a recommendation against use		
E	Good evidence to support a recommendation against use	III	Expert opinion

Table 8-2: Strength of recommendation based on quality of evidence rating system (adapted from the IDSA/USPHS rating system)

Standard precautions
Hand hygiene—always perform before and after each patient contact (whether gloves are worn or not)
Gloves—when contact with non-intact skin or body fluids is anticipated
Gowns—when changing dressings on open wounds
Masks and eye protection—based on anticipated or potential exposure
Contact precautions*
Gloves and gowns—with all patient care
Cohorting
Separation of long-term (>72 h) and short-term (<72 h) admissions should be considered
Antibiotic control
Avoid unnecessary empiric use of broad spectrum antimicrobials
Establish local antibiogram to guide initial empiric therapy
Limit antibiotic duration

* Used with patients with known or suspected MDRO infection or colonization

Table 8-3: Infection control techniques to reduce nosocomial transmission of MDROs

TCCC	Preferred Agent	Alternate Agent	Duration
Open extremity wounds	Moxifloxacin 400 mg PO	Levofloxacin 500 mg PO	1 dose
Penetrating abdominal injury, shock, or unable to tolerate oral medication	Ertapenem 1 gm IV/IM	Cefoxitin 2 gm IV/IM	1 dose

Table 8-4: Antimicrobial therapy for prevention of infection in combat-related trauma during the care of casualties under tactical situations when evacuation is expected to be delayed (> 3 hours)

The three phases of TCCC in which these antibiotic choices apply are “Care Under Fire,” which is the care rendered by the medic or first responder at the scene while still under effective hostile fire; “Tactical Field Care,” which is care rendered by the medic once no longer under effective hostile fire and medical equipment is still limited; and “Combat Casualty Evacuation Care,” which is the care rendered once the casualty has been picked up by evacuation vehicles but has not reached a higher level of care, including a BAS or forward surgical team.

Injury	Preferred Agent(s)	Alternate Agent(s)	Duration
Skin, Soft Tissue, Bone			
Skin, soft tissue, no open fractures	Cefazolin, 1 gm IVq8h	Clindamycin 900 mg IVq8h	72 hours
Skin, soft tissue, with open fractures, exposed bone, or open joints	Cefazolin, 1 gm IVq8h	Clindamycin 900 mg IVq8h	72 hours
Thoracic Cavity			
Penetrating chest injury, with chest tube	Based on wound (see skin, soft tissue above)	Based on wound	N/A
Abdomen			
Penetrating abdominal injury with suspected/known hollow viscus injury and soilage; may apply to rectal injuries as well	Antibiotics with broad spectrum activity, including anaerobic activity. Options include cefoxitin 1-2 gm IV q6-8h, or piperacillin/tazobactam 4.5 gm IVq6h	Levofloxacin 750 mg IV once daily, or ciprofloxacin 400 mg IV q8-12h AND metronidazole 500 mg IVq6h, OR moxifloxacin 400 mg IV (monotherapy)	24 hours after definitive cleaning
Maxillofacial			
Open maxillofacial fractures, or maxillofacial fractures with foreign body or fixation device	Cefazolin 2 gm IV q8h (higher dose recommended because of failures at 500 mg)	Clindamycin 900 mg IVq8h	24 hours
Central Nervous System			
Penetrating brain injury	Cefazolin 1 gm IV q8h. Consider extending bacterial activity if gross contamination. Options included cefazolin AND gentamicin AND penicillin	Ceftriaxone 2 gm IV q24h. Consider extending bacterial activity if gross contamination. Options include cefazolin AND gentamicin AND penicillin. For penicillin allergic patient Vancomycin 1 gm IV q12h and ciprofloxacin 400 mg IV q8-12h	5 days
Penetrating spinal cord injury	As above. Add anaerobic bacterial activity if abdominal cavity is involved. Options include metronidazole 500 mg IVq6-8h	As above. Add anaerobic bacterial activity if abdominal cavity is involved. Options include metronidazole 500 mg IV q6-8h	5 days

Eye			
Eye injury, burn, or abrasion	Topical: Erythromycin or Bacitracin ophthalmic ointment QID and PRN for symptomatic relief Systemic: No systemic treatment required	Fluoroquinolone 1 drop QID	Until epithelium healed (no fluorescein staining)
Eye injury, penetrating	Topical: Prior to primary repair, no topical agents should be used unless directed by ophthalmology Systemic: Levofloxacin 750mg IV/PO once daily	Ciprofloxacin 500mg PO or 400mg IVq12h	3-5 days
Burns			
Burns	Topical: Large full thickness and contaminated burns should be treated with mafenide acetate once daily (mornings) and silver sulfadiazine once daily (afternoons). Systemic: No systemic treatment required	Mafenide acetate or silver sulfadiazine to wounds twice daily. More limited (clean) full thickness burns may be treated with silver-impregnated dressings. Biobrane can be used in partial thickness burns.	Until healed or grafted
* These guidelines do not advocate adding enhanced gram-negative bacterial activity in Type III fractures (ciprofloxacin 400 mg IV q8h or amikacin 15-20 mg/kg IV once daily)			

Table 8-5: Selection and duration of antimicrobial therapy for prevention of infection in combat-related trauma

Type of open fracture	Description	Infection risk *
Type I	Puncture wound < 1 cm	0–2%
Type II	Laceration wound > 1 cm Moderate soft-tissue damage and crushing Bone coverage adequate and comminution is minimal	2–10%
Type III		10–50%
A	Extensive soft tissue damage, severe crushing, adequate bone coverage	
B	Periosteal damage and bone exposure with severe contamination and bone comminution, flap needed	
C	Arterial injury requiring repair	

*Based on data from civilian trauma. Tibial fractures have up to 2 times higher risk of infection than other injury sites with similar types of open fracture.

Table 8-6: Grading of extremity injuries with fracture and their infection risk

Clinical Practice Guideline for the Prevention of Infection Following Combat-Related Injuries

Care at point of injury (Level I):

- Evacuate to surgical care within six hours (BII).
- Bandage wound with sterile dressing; stabilize for evacuation to Level IIb/III (AII).
- Single dose of oral or IV/IM antibiotics (within three hours of injury) (Table 8-4) should only be given if evacuation is delayed (AII).

Patient care without surgical support (Level I and IIa):

- Level I (BAS):
 - Evacuate to surgical evaluation within six hours (BII).
 - Primary wound management consist of irrigation to remove gross contamination (BIII); use normal saline, sterile or potable water (AI); under low pressure (BII) with no additives (DII).

- Bandage wound with sterile dressing (avoid pressure dressings over eyes) (AII)
- Intravenous (IV) antibiotics within three hours of injury (AII); IV infusion of antibiotics is preferred over IM in hemodynamically compromised patients
- Antibiotic choice per Table 8-4 (AI) without enhanced gram-negative activity (DIII)
- Tetanus immunoglobulin and toxoid as appropriate (AII)
- Level IIa - (medical company):
 - Same as Level I (BAS)
 - Consider treating at the local facility with a single dose of antibiotics without surgical evaluation for small retained fragments that only involve soft tissue injury (x-ray confirmation of no bone involvement, no joint or vascular involvement, and no break of pleura or peritoneum), wound entry/exit lesions less than two centimeters in maximal dimension, and wound not frankly infected (BII)

Care with surgical support (Level IIb and III):

- Casualties should undergo surgical evaluation within six hours of injury (BII); surgical intervention can be delayed past six hours based on tactical reasons (CIII)
- Do not obtain routine pre- or post-procedure microbial cultures (EII); cultures should only be obtained when there is clinical evidence of infection
- Wounds should be aggressively debrided with removal of all necrotic tissue and foreign bodies easily reached (AII); eye (BII) and spine injuries without neurological compromise (CIII) can await surgical debridement until surgical expertise is available; cerebral foreign bodies may remain if removal would cause excess damage (BII)
- Wounds should be irrigated until clean; extremity injuries should be irrigated based upon type of fracture (Type I (3 L), Type II (6 L), and Type III (9 L)) (BIII); abdominal trauma typically requires six liters of fluid (BIII). Irrigation fluids can include normal saline or sterile water; potable water may be used in the event these solutions are not available (AI). Fluid additives are not recommended (DII); no high pressure irrigation should be performed (BIII low pressure (less than 14 PSI), DII high pressure)
- Antibiotics should be infused within three hours of injury (AII); avoid overly broad spectrum antibiotics and minimize duration (Table 8-5) (for extremity injuries with fracture: first generation cephalosporin (AI); enhanced gram-negative activity agent is not recommended (DIII)); antibiotics activity should best reflect the most contaminated site (abdominal/face/CNS/eye/extremity); duration should be short (Table 8-5) (BII) and not extended for open wounds, drains, or external fixation devices (BIII); antibiotic cement can be used for extremity injuries in patients not evacuated (BII), but should not be used for patients expected to be evacuated or transferred in one to three days (DIII); topical wound therapy is recommended for burn

patients (AII), but not other injuries; retained foreign body in the eye, spine or brain should receive antibiotics as indicated in the table

- Adjunct therapy includes tetanus immunoglobulin and toxoid as necessary (AII); immunization against encapsulated organisms at 14 days after trauma for patients who have their spleen removed (CIII)
- Extremity wounds should be left open in theater (EII, immediate primary closure); skin should not be closed if there is a colon injury or extensive devitalized tissue due to excessive infectious complications (BIII); early primary repair of complex or destructive colonic injuries is not recommended (BII), especially if associated with massive blood transfusion, on-going hypotension, hypoxia, reperfusion injury, multiple other injuries, high velocity injury, or extensive local tissue damage; simple, isolated colon injuries may be repaired primarily (AI). VAC appears effective in the combat zone (BII) but its role during air evacuation is unclear at this time (CIII); if no evacuation at three to five days consider closing wounds if no evidence of infection (BII); injuries to the face (BII) and brain (BIII) require early closure of the mucosal lining and dura or skin covering the brain
- Extremities should be stabilized by external fixation if required but close clinical monitoring for infection is recommended (AII)

Care associated with personnel not evacuated rapidly out of the combat zone: Should reflect Level IV and V care outlined in the accompanying reviews; facility specific antibiograms should be developed (AII); infection control procedures should be implemented (AII); management strategies after 72-hours of admission should emphasize nosocomial infections

Endnotes

1. M.R. Smallman-Raynor and A.D. Cliff, "Impact of Infectious Diseases on War," *Infectious Disease Clinic North America*, 18:341-368, 2004.
2. G. Majno, *The Healing Hand: Man and Wound in the Ancient World*, Boston: Harvard University Press, 1991, pp.1-400.
3. B.A. Pruitt, Jr., "Combat Casualty Care and Surgical Progress," *Annals of Surgery*, 243:715-729, 2006.
4. R.L. Mabry, J.B. Holcomb, A.M. Baker, et al., "United States Army Rangers in Somalia: an Analysis of Combat Casualties on an Urban Battlefield," *Journal of Trauma*, 49:515-528, 2000.
5. B.D. Owens, J.F. Kragh, Jr., et al. "Characterization of Extremity Wounds in Operation Iraqi Freedom and Operation Enduring Freedom," *Journal of Orthopedic Trauma*, 21:254-257, 2007.
6. "Weapons Effects and Parachute Injuries," *Emergency War Surgery*, 3rd U.S. revision, Borden Institute, Washington, D.C. 1.1-1.15, 2004.
7. R.M. Hardaway, "3rd Vietnam Wound Analysis," *Journal of Trauma*, 18:635-643, 1978.
8. M.E. Carey, "Analysis of Wounds Incurred by U.S. Army Seventh Corps Personnel Treated in Corps Hospitals during Operation Desert Storm, February 20 to March 10, 1991," *Journal of Trauma*, 40 (3 Suppl):S165-S169, 1996.

9. C.S. Leedham, C.G. Blood, and C. Newland, "A Descriptive Analysis of Wounds among U.S. Marines Treated at Second-echelon Facilities in the Kuwaiti Theater of Operations," *Military Medicine*, 158:508-512, 1993.
10. D.S. Kauvar, S.E. Wolf, C.E. Wade, et al., "Burns Sustained in Combat Explosions in Operations Iraqi and Enduring Freedom," (OIF/OEF explosion burns), *Burns*, 32:853-857, 2006.
11. P.J. Parker, "Damage Control Surgery and Casualty Evacuation: Techniques for Surgeons, Lessons for Military Medical Planners," *Journal of Royal Army Medical Corps*, 152:202-211, 2006.
12. E.N. Johnson, T.C. Burns, R.A. Hayda, et al., "Infectious Complications of Open Type III Tibial Fractures Among Combat Casualties," *Clinical Infectious Diseases*, 45:409-415, 2007.
13. M.C. Albrecht, M.E. Griffith, C.K. Murray, et al., "Impact of Acinetobacter Infection on the Mortality of Burn Patients," *Journal of the American College of Surgeons*, 203:546-550, 2006.
14. N.E. Aronson, J.W. Sanders, and K.A. Moran, "In Harm's Way: Infections in Deployed American Military Forces," *Clinical Infectious Diseases*, 43:1045-1051, 2006.
15. K. Petersen, M.S. Riddle, J.R. Danko, et al., "Trauma-related Infections in Battlefield Casualties from Iraq," *Annals of Surgery*, 245:803-811, 2007.
16. H.C. Yun, C.K. Murray, S.A. Roop, et al., "Bacteria Recovered from Patients Admitted to a Deployed U.S. Military Hospital in Baghdad, Iraq," *Military Medicine*, 171:821-825, 2006.
17. C.K. Murray, H.C. Yun, M.E. Griffith, et al., "Acinetobacter Infection: What was the True Impact during the Vietnam Conflict?" *Clinical Infectious Diseases*, 43:383-384, 2006.
18. P. Scott, G. Deye, A. Srinivasan, et al., "An Outbreak of Multidrug-resistant *Acinetobacter baumannii*-calcoaceticus Complex Infection in the U.S. Military Health Care System Associated with Military Operations in Iraq," *Clinical Infectious Diseases*, 44:1577-1584, 2007.
19. M.W. Ellis, D.R. Hospenthal, D.P. Dooley, et al., "Natural History of Community-acquired Methicillin-resistant *Staphylococcus aureus* Colonization and Infection in Soldiers," *Clinical Infectious Diseases*, 39:971-979, 2004.
20. J.M. Zouris, G.J. Walker, J. Dye, and M. Galarneau, "Wounding Patterns for U.S. Marines and Sailors during Operation Iraqi Freedom, Major Combat Phase," *Military Medicine*, 171:246-252, 2006.
21. C.K. Murray, J.C. Reynolds, J.M. Schroeder, et al., "Spectrum of Care Provided at an Echelon II Medical Unit during Operation Iraqi Freedom," *Military Medicine*, 170:516-520, 2005.
22. S.M. Bird and C.B. Fairweather, "Military Fatality Rates (by cause) in Afghanistan and Iraq: a Measure of Hostilities," *International Journal of Epidemiology*, 36:841-846, 2007.
23. C.K. Murray, S.A. Roop, and D.R. Hospenthal, "Medical Problems of Detainees after the Conclusion of Major Ground Combat during Operation Iraqi Freedom," *Military Medicine*, 170:501-504, 2005.

24. F.K. Butler , Jr., J. Hagmann, and E.G. Butler, "Tactical Combat Casualty Care in Special Operations," *Military Medicine*, 161 (Suppl):3-16, 1996.
25. M.L. Landrum and C.K. Murray, "Ventilator Associated Pneumonia in a Military Deployed Setting: the Impact of Aggressive Infection Control Program," *Journal of Trauma*, 64(2 Suppl):S123-S127, 2008.
26. F. Butler and K. O'Connor, "Antibiotics in Tactical Combat Casualty Care 2002," *Military Medicine*, 168:911-914, 2003.
27. G.W. Bowyer, "Management of Small Fragment Wounds: Experience from the Afghan Border," *Journal of Trauma*, 40 (3 Suppl):S170-S172, 1996.

Acknowledgments

We would like to thank Amy Newland for her expertise in manuscript preparation and assistance in organizing and conduct of the consensus conference.

Corresponding author:

Duane R. Hospenthal, COL, MC, USA
Infectious Disease Service (MCHE-MDI)
Brooke Army Medical Center
3851 Roger Brooke Drive
Fort Sam Houston, Texas 78234
Phone 210-916-4355
Fax 210-916-0388
Duane.Hospenthal@amedd.army.mil

Acronyms

AAR	after-action review
AFSOC	Air Force Special Operations Command
ANA	Afghan National Army
ANP	Afghan National Police
ANSF	Afghan National Security Force
ATP	advance tactical practitioner
AOR	area of responsibility
ASG	Abu Sayyaf Group
AFP	Armed Force of the Philippines
ACLS	advanced cardiac life support
ACC	air combat command
AO	area of operation
BAS	battalion aid station
CASEVAC	casualty evacuation
CALL	Center for Army Lessons Learned
CSTC-A	Combined Security Transition Command-Afghanistan
CA	civil affairs
CSH	combat support hospital
CME	cooperative medical engagement
COIN	counterinsurgency
CoG	center of gravity
CMO	civil-military operations
CRC	CONUS replacement center
CDC	Center for Disease Control
CSAR	combat search and rescue
CONUS	continental United States
CERP	Commander's Emergency Response Program
CJSOTF	combined joint special operations task force
CMP	civil military projects
CRITICAL	C-Contain scene and assess casualties, R-Rapidly identify and control massive hemorrhage, I-inspect and ensure patients airway, T-Treat life threatening chest injuries, I-Inspect for bleeding, gain IV access, manage shock, C-Control pain and prevent infection, A-Aid and litter team, L-Leader coordinated evacuation

COWCRAP	
CMA	civil military action
Cm	centimeters
DOD	Department of Defense
DHHS	Department of Health and Human Services
DNBI	disease and non-battle injury
EMEDS	expeditionary medical support
EAB	echelon above brigade
FID	foreign internal defense
FST	forward surgical team
FTT	female treatment team
FLA	front line ambulance
GERD	gastroesophageal reflux disease
GWOT	Global War on Terrorism
GMV	ground mobility vehicle
HA	humanitarian assistance
HCP	health care provider
ISAF	International Security Assistance Force
IED	improvised explosive device
IV	intravenous
IO	intraosseous
IM	intramuscular
ICU	intensive care unit
JLLIS	Joint Lessons Learned Information System
JLLP	Joint Lessons Learned Program
JMEAC	Joint Medical Enlisted Advisory Council
JSOM	Journal of Special Operations Medicine
JSOMTC	Joint Special Operations Medical Training Center
JPTA	Joint Patient Tracking Application
KIA	killed in action
LL	lessons learned
LRMC	Landstuhl Regional Medical Center
LN	local national

LMA	laryngeal mask airway
MEDEVAC	medical evacuation
MEDCAP	Medical Civil Action Program
MRAP	mine resistant, ambush protected
MSL	mean sea level
MD	medical doctor
MTF	medical treatment facility
Mg	milligrams
mL	milliliters
MoPH	Ministry of Public Health
mg/kg	milligrams/kilograms
NATO	North Atlantic Treaty Organization
NGO	nongovernmental organization
OEF	Operation Enduring Freedom
OIF	Operation Iraqi Freedom
OIL	observations, insights, and lessons
OHDACA	overseas humanitarian disaster and casualty assistance
ODA	Operational Detachment-Alpha
OP	observation post
OTFC	oral transmucosal fentanyl citrate
PRT	provincial reconstruction team
PJ	pararescueman
PM	preventive medicine
PA	physician assistant
PMMA	polymethylacrylate
PO	per os or oral
PASG	Pneumatic Antishock Garment
PRBCs	packed red blood cells
PMESII-PT	political, military, economic, social, infrastructure, information, plus physical environment and time
PRN	as needed
q8h	every 8 hours
QID	once a day

RMED	Ranger medic
RAD	reactive airway disease
RTD	return to duty
RCT	randomized controlled trial
SAR	seasonal allergic rhinitis
SOMA	Special Operations Medical Association
SOF	special operations forces
SEAL	Sea, Air, and Land
SOCOM	Special Operations Command
SOP	standing operating procedure
SFG	special forces group
SOCMSSC	Special Operations Combat Medic Skills Sustainment Course
TB	tuberculosis
TCCC	tactical combat casualty care
TTP	tactics, techniques, and procedures
URI	upper respiratory infection
UW	unconventional warfare
USASOC	United States Army Special Operations Command
USSOCOM	United States Special Operations Command
USAID	United States Agency for International Development
USDA	United States Department of Agriculture
USAMMA	United States Army Medical Material Agency
USCENTCOM	United States Central Command
VETCAP	Veterinary Civil Action Program
VOIP	Voice over Internet Provider
VMO	village medical outreach
WRAMC	Walter Reed Army Medical Center
</>	Less than/greater than

References

Articles

F.K. Butler, J.B. Holcomb, S.D. Giebner, et al., "Tactical Combat Casualty Care 2007: Evolving Concepts and Battlefield Experience," *Military Medicine*, 172(1 Suppl):S1-S19(1), 2007.

Donald F. Thompson, "The Role of Medical Diplomacy in Stabilizing Afghanistan," *Defense Horizons*, No. 63, May 2008.

Other

Marine Corps Lessons Learned Program

MAJ Stacy Usher Weina, 13 October 2007 (Female Treatment Teams After Action Report)

Special Operations Medical Association Conference 2007

Center for Army Lessons Learned

10 Meade Avenue, Building 50
Fort Leavenworth, KS 66027-1350



Center for Army Lessons Learned (CALL)

<http://call.army.mil>

Combined Arms Center (CAC) • Ft. Leavenworth, KS